# THE DEVELOPMENT OF AN INNOVATION LEADERSHIP QUESTIONNAIRE

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## DECLARATION

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## ABSTRACT

The ability of organisations to be successful in the current global business environment will ultimately be dependent on their ability to be innovative. However, creativity and innovation will not take place spontaneously in any team setting and will be the result of meticulous planning and implementation efforts on the part of the team's members.

The current global business environment is characterised by constant change and this makes leadership more important than ever before as leaders are considered the drivers of change and ultimately responsible for organisational success. Leaders within organisational team settings have an essential role to fulfil in stimulating and facilitating innovative behaviour in their subordinates. The fact that some leaders manage to successfully stimulate and facilitate innovative behaviour in their subordinates, while others fail to do so, might well be contributed by some to a number of simplistic variables– but this is not the case.

The fact that some leaders manage to successfully stimulate and facilitate innovative behaviour in their subordinates can be attributed to the fact that these leaders possess specific competencies based on different sets of knowledge, skills and attitudes. The innovation process consists of four distinct phases (idea generation, idea screening, feasibility and commercialisation) and innovative outcomes for a team will only result if team members successfully progress through each of these four phases.

The reality, however, is that the innovation process itself is filled with challenges that will need to be overcome by team members if innovation is to flourish. Accordingly leaders should apply specific sets of knowledge, skills and attitudes during each of the phases in the innovation process to help guide subordinates successfully through the innovation process. It should hence be clear that being aware of the specific leadership competencies that will stimulate and facilitate innovative behaviour in subordinates will be of immense value to any organisation who wishes to act more innovatively.

The primary purpose of this study was consequently to design a psychological measurement instrument that would provide a measure of the specific competencies leaders should possess to stimulate and facilitate innovative behaviour in subordinates. This instrument would enable management to customise training and development programmes to meet the specific needs of leaders and hence develop the necessary knowledge, skills and attitudes on their part.

A pilot study was conducted with the experimental version of the ILQ to obtain information regarding the psychometric properties of the instrument. Results obtained from the pilot

study provided evidence that the ILQ instrument possesses high levels of internal reliability and satisfactory levels of concurrent validity. It can therefore be claimed that the ILQ instrument would serve as a valuable diagnostic tool for organisations who wish to improve their innovative capabilities.

## OPSOMMING

Die mate waartoe organisasies suksesvol sal wees in die huidige globale besigheidsomgewing sal bepaal word deur hul vermoë om innoverend op te tree. Dit is belangrik om daarop te let dat kreatiwiteit en innovasie nie spontaan sal plaasvind binne ‘n spankonteks nie, maar eerder die resultaat sal wees van doelbewuste praktyke en gedrag deur spanlede.

Die huidige globale besigheidsomgewing word gekenmerk deur konstante verandering en lei daartoe dat leierskap belangriker as ooit geag word vanweë die feit dat leiers beskou word as die dryfkrag vir verandering en verantwoordelik is vir organisasie sukses. Spanleiers in organisasies moet ‘n essensiële rol vervul met betrekking tot die stimulering en fasilitering van innoverende gedrag in hul ondergeskiktes. Die feit dat sommige leiers dit regkry om suksesvol innoverende gedrag in hul ondergeskiktes te stimuleer en te fasiliteer, terwyl ander leiers misluk om dit reg te kry, word deur sommige individue aan ‘n klein aantal eenvoudige veranderlikes toegeskryf – dit is egter nie die geval nie.

Die feit dat sommige leiers dit regkry om suksesvol innoverende gedrag in hul ondergeskiktes te stimuleer en te fasiliteer, kan toegeskryf word aan die feit dat hierdie leiers oor sekere bevoegdhede beskik gebaseer op spesifieke stelle kennis, vaardighede en houdings. Die innovasieproses bestaan uit vier onderskeie fases (idee-generering, idee-evaluering, bepaling van uitvoerbaarheid en kommersialisering) en werkspanne sal slegs innoverende uitkomstes behaal indien hulle suksesvol vorder deur elkeen van hierdie vier fases. Die realiteit is egter dat die innovasieproses inherent gevul is met uitdagings wat oorkom sal moet word deur spanlede indien innovasie enigsins sal floreer in die spanne.

Dit is dus noodsaaklik dat leiers ‘n spesifieke versameling kennis, vaardighede en houdings sal aanwend om die pogings van ondergeskiktes suksesvol te bestuur deur die verskeie fases van die innovasieproses. Om kennis te dra omtrent die spesifieke leierskap-bevoegdhede – gebaseer op kennis, vaardighede en houdings – wat innoverende gedrag in ondergeskiktes sal stimuleer en fasiliteer, sal van onskatbare waarde wees vir organisasies.

Die doel van hierdie studie was gevolglik om ‘n meetinstrument te ontwerp wat die bevoegdhede sal meet waaroor leiers moet beskik indien hulle beoog om suksesvol innoverende gedrag in hul ondergeskiktes te stimuleer en te fasiliteer. ‘n Meetinstrument van hierdie aard sal organisasies en hul bestuur in staat stel om opleiding en ontwikkeling programme nommerpas te maak en sodoende spesifieke bevoegdhede in hul leiers te ontwikkel.

‘n Loodsstudie is vervolgens uitgevoer om inligting rakende die psigometriese eienskappe van die instrument te verkry. Die resultate het getoon dat die ILQ oor hoë vlakke van interne betroubaarheid beskik, asook bevredigende vlakke van samevallende geldigheid. Die aanspraak kan gevolglik gemaak word dat die ILQ as ‘n waardevolle diagnostiese instrument vir enige organisasie sal dien wat beoog om hul innoverende vermoë uit te brei.

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## 1.1 Introduction

The success and survival of organisations functioning in the modern-day business environment will ultimately depend on their innovative capabilities as innovation has redefined the manner in which organisations obtain a sustainable competitive advantage in the current business environment.

Traditionally, organisations managed to secure a competitive advantage in their industry by focusing on variables such as scale, production efficiency and market control. These traditional means to securing a competitive advantage have, however, become less important in the twenty-first century due to the development of new and/or improved technologies, as well as production methods, and invariably the impact of globalisation. Instead, the ability of organisations to obtain a sustainable competitive advantage in their respective industries will now depend on the organisation's capacity to maintain sustained innovation in its products, processes and practices (Dess & Pickens, 2000).

Globalisation has had a significant impact on the internal and external business environments in which organisations function as these settings are characterised by elements of constant change and increased uncertainty. The critical role that innovation has to fulfil in the attempts of organisations to achieve success in their industries will be fully grasped once one obtains clarity regarding the modern-day internal and external environments in which organisations find themselves.

The external environment refers to factors outside of the organisational domain and includes the competitive-, supplier-, regulatory-, social-, labour-, customer-, technological- and global environments in which organisations function (Morris, Kuratko & Covin, 2008).

The present *Competitive Environment* is characterised by aggressive and highly innovative competitors who possess a "take no prisoners" attitude. Competitors may even present themselves in the form of clients and customers and make use of unconventional tactics to attain a sustainable competitive advantage in the marketplace (Morris et al., 2008).The current *Resource Environment* is faced with the challenge of resources becoming increasingly scarce and this is generally as a result of natural resources becoming more and more depleted over time. The increased scarcity of resources has also led to the fact that resources are becoming obsolete relatively quickly, while the sources of supply are

becoming increasingly unknown due to its scarcity – forcing organisations to make the most of the resources at their disposal (Morris et al., 2008).

The modern-day *Legal and Regulatory Environment* emphasises the importance of free and fair trade in the marketplace. This increased environmental regulation implies that products and/or services delivered by organisations are obligated to comply with strict rules and guidelines as product liability on the part of the organisation is virtually unlimited (Morris et al., 2008).The current *Labour Environment* is characterised by a mobile workforce that frequently changes employers throughout their career-span, forcing organisations to increasingly rely on sources of contract labour. The growing scarcity of skilled employees in the labour market in conjunction with the increased costs related to employee-related matters, such as employee benefits, as well as training and development, contributes to the fact that organisations worldwide constantly struggle to retain the members of their workforce (Morris et al., 2008).

The modern-day *Customer Environment* consists of markets that have become increasingly fragmented and segmented, resulting in more demanding customers/clients with complex needs. Customers/clients are presented with a wide variety of products/services to their disposal and place value not only on the quality of these products/services, but also on additional factors such as the support services and/or functionality associated with specific products/services. The challenge for organisations therefore becomes one of not only investing in, but more importantly, capturing a customer/client's lifetime value – thereby placing greater emphasis on customer service and long term customer satisfaction, rather than focusing on maximizing short-term sales (Morris et al., 2008).The present *Technological Environment* is characterised by products/services becoming obsolete faster than ever before as a result of the accelerated development of new technologies. This rapid rate of technological advancement has empowered many organisations and levelled the playing field, thereby enabling many small firms to compete with other large, well-known and established organisations in their industry (Morris et al., 2008).

As one considers all the preceding factors collectively, it soon becomes evident that the modern-day *Global Environment* has become increasingly competitive due to the impact of globalisation. Initiatives such as real-time communication has to a large extent nullified conventional restrictions and/or boundaries organisations have become used to over previous years as production and distribution of an organisation's products/services could now take place virtually anywhere in the world. Globalisation has essentially turned the traditional business approach of organisations on its head by transforming the competitive arena organisations have become used to over previous years, restricted by national and/or

international boundaries, into a global arena where organisations compete with another worldwide (Morris et al., 2008).

In contrast, the internal environment includes the structures, systems, processes, and culture(s) that collectively form the climate of an organisation (Morris et al., 2008). One should, however, refrain from considering the external and internal environments of organisations in isolation as both these environments exert a significant influence on another by way of the bi-directional relationship that exists between them. This bi-directional relationship is clearly reflected by the fact that turbulence in the external environment will cause organisations to make some fundamental changes in their internal structures, systems and processes.

A positive feature regarding the complex, dynamic and hostile environment in which modern-day organisations find themselves, entail that turbulence also represents a sense of opportunity (Morris et al., 2008). In other words, while globalisation has closed doors in some areas, new doors will be opened and ample opportunities will exist for innovative organisations.

While the external and internal business environments have become synonymous with constant change, the need for organisations to obtain a sustainable competitive advantage over competitors has and will always remain constant. This need to obtain a sustainable competitive advantage over competitors is clearly illustrated by practices whereby organisations are constantly required to reduce their costs, enhance customer service and improve the quality of their products/services merely to remain competitive in the marketplace (Morris et al., 2008).

It has to be emphasised that merely remaining competitive and obtaining a sustainable competitive advantage over competitors differ from another as the latter requires of an organisation and its team members to continuously reinvent themselves. The means by which this reinvention of the organisation and its team members will be facilitated will take the form of innovation, more specifically, continuous innovation on the part of the organisation and its workforce.

Barsh, Capozzi and Davidson (2008) indicates that an organisation's ability to innovate – to tap the fresh value-creating ideas of its employees and those of its partners, customers, suppliers, and parties beyond its own boundaries – has become the core driver of organisational growth, performance, and valuation. Similarly, De Jong and Den Hartog (2007) found that organisations need to capitalise on the abilities of its employees to innovate as employees will ultimately have an instrumental role to fulfil in the improvement of

an organisation's performance. Organisations invest substantial amounts of time and resources into its intellectual capital (i.e. employees) and therefore expect of its workforce to generate ideas that will serve as the building blocks for new and/or improved products, services and work processes.

Innovation is regarded by some as the main driver of organisational prosperity, growth and sustained profitability (Elmquist, Fredberg & Ollila, 2009). Other researchers corroborate this finding by indicating that organisations will attempt to gain a sustainable competitive advantage over competitors by managing innovation in order to create new and improved products and/or services (Brühl, Horch & Osann, 2010). As a result, the development of an organisation's innovative capability has become a major priority and strategy worldwide. This is no different in the South African business context as Geraldine Fraser-Moleketi (2004, p. 21), the then Minister of Public Service and Administration, mentioned "...the qualities and skills of entrepreneurship and innovation need to be developed among South Africans to drive growth, only then will the country's long term prospects improve".

Considering the critical role innovation has to fulfil in organisational prosperity, it soon becomes evident that the question is not whether organisations should engage in innovative initiatives or not, but rather what can organisations do to facilitate high levels of innovation within its workforce. This being said, stimulating and maintaining a high level of innovation within an organisation remains a challenging endeavour, specifically due to the multi-dimensional and complex nature of the innovation construct.

In practice, innovation presents itself in various forms and, by specifying the object undergoing change, one would be able to differentiate between product-, process-, market-, and organisational innovation. Furthermore, a distinction can be made between the different types of innovation in terms of their "newness" or "radicalness" and this is more commonly referred to as the degree of innovation. The innovation process itself is considered a complex phenomenon due to the fact that it rarely occurs in a linear fashion and the fact that it cannot be split up easily into separate phases or phases (Anderson, De Dreu & Nijstad, 2004). The need to generate and implement ideas alternates throughout the innovation process in an ever-changing manner (Rosing, Frese & Bausch, 2011) and contributes to the fact that the innovation process is filled with paradoxes and tensions. The complex and dynamic nature of the innovation construct clearly illustrates that innovative behaviour on the part of an organisation's workforce cannot be regarded a spontaneous phenomenon. Rather, innovative behaviour on the part of an organisation's workforce will be the end-result of specific and purposeful innovation-stimulating initiatives on the part of the organisation and its team members. Research literature on innovation indicates in several studies that one of

the most essential innovation-stimulating initiatives on the organisation's part will take the form of leadership (Jansen, Vera, & Crossan, 2009; Nemanich & Vera, 2009; Yukl, 2009).

Leadership is regarded by many as one of the most influential predictors of innovation (Mumford, Scott, Gaddis & Strange, 2002) due to the fact that leaders take responsibility for managing the overall innovation process, developing and implementing an innovation strategy, as well as establishing and maintaining a culture of innovation within the organisation. The characteristics associated with leaders of creative subordinates have been discussed in numerous research studies (Mumford et al., 2002; Redmond, Mumford & Teach, 1993; Stoker, Looise, Fisscher, & De Jong, 2001) with the primary purpose of determining how these leaders manage to elicit innovative behaviour from their subordinates. These studies provide insight into the fact that one can clearly differentiate between leaders that successfully manage to elicit innovative behaviour from their subordinates and those who fail to do so on the grounds of the specific skills, knowledge and attitudes these leaders possess.

In other words, the process whereby some leaders manage to successfully elicit innovative behaviour from their subordinates should not be regarded a random process, but rather be attributed to the fact that these leaders possess specific knowledge, skills and attitudes that make them more inclined to elicit innovative behaviour from their subordinates.

From the above arguments it can be established that innovation will positively contribute to organisational performance and therefore the issue of innovation has to be attended to if organisations aspire to obtain a sustainable competitive advantage over its competitors. Leadership on its part has been strongly associated with innovation, as mentioned before, and therefore leaders within organisations could serve as the vehicle to increase the levels of innovative behaviour of an organisation's workforce.

Merely attributing innovative behaviour in subordinates as a whole to leadership would be an oversimplification of the complex process whereby leaders manage to elicit innovative behaviour from subordinates. Instead, it would serve useful to determine how the underlying knowledge, skills and attitudes of leaders collectively determine why some subordinates decide to act in an innovative fashion while others neglect to do so. By studying the innovation process and its phases in-depth a picture soon emerges of the knowledge, skills and attitudes considered necessary to facilitate the occurrence of innovation in organisations. Gaining clarity regarding the knowledge, skills and attitudes necessary for eliciting innovative behaviour in subordinates will be of immense value for any organisation intending to increase the innovative capabilities of its workforce. More specifically, organisations will be in a position to educate and train their leaders in terms of the

knowledge, skills and attitudes necessary to facilitate innovative behaviour in subordinates. Organisations will have the ability to consciously increase the levels of innovative behaviour in the organisation by developing specific sets of knowledge, skills and attitudes in their leaders. These increased levels of innovative behaviour will then accordingly positively impact on the performance of the organisation as a whole.

The general objective of this study, consequently, is to determine what specific knowledge, skills and attitudes on the part of team leaders will elicit innovative behaviour in subordinates, and having determined that, to develop an instrument that would reliably and validly measure the degree to which a team leader possesses these desired types of knowledge, skills and attitudes.

### 1.2 Research Objectives

Flowing from the general objective, the following research objectives are formulated:

- To conceptualise creativity and innovation, as well as the antecedents and outcomes thereof, from the literature.
- To investigate various leadership theories and their relationship to innovation.
- To evaluate the critical roles fulfilled by leaders during the innovation process.
- To conceptualise leadership knowledge, skills and attitudes in relation to the various phases in the innovation process.
- To compile a measurement instrument with which subordinates can rate the knowledge, skills and attitudes of their leaders throughout the various phases in the innovation process.
- To execute a pilot study with the measurement instrument to obtain initial information regarding its psychometric properties.

# CHAPTER 2: LITERATURE STUDY

## 2.1 Introduction

A large number of variables have been proposed as determinants of innovative behaviour in individuals. In general, these variables can be grouped in three categories namely *individual* factors, *organisational* factors and *environmental* factors (Valencia, Valle & Jimenez, 2010). The focus of this thesis will mainly be on the organisational factors as it is regarded by many researchers as the largest determinant of innovation (Damanpour, 1991), the emphasis will specifically be on the role of leadership in facilitating an innovative organisational culture.

As a point of departure, it will serve useful to obtain a brief overview of the *individual* factors (i.e. characteristics and traits) which make some individuals more inclined to act in an innovative fashion than their counterparts. Traits that have been associated with innovative individuals in research literature includes a desire for autonomy and social independence, a high tolerance of ambiguity during problem-solving, and a propensity for risk-taking (McAdam & McClelland, 2002). Research findings by West (1997) furthermore indicate that creative individuals generally hold intellectual and artistic values, are attracted to complex situations, have the ability to tolerate ambiguity, are driven to excellence, persevere during adversity and possess high levels of self-efficacy.

McClelland (2002) conducted a research study and found that individuals with a high need for achievement were more inclined to engage in entrepreneurial activities in comparison to other individuals with lower achievement thresholds. Intrapreneurs, referring to entrepreneurs operating within an organisational context, tend to focus on satisfying their need for achievement and will search for more challenge and autonomy in their work, with less emphasis on financial gains and incentives (Burns & Kippenberger, 1988). Therefore, it is essential that leaders take cognisance of the individual factors associated with innovative behaviour as research findings indicate that leaders will become more effective if they adapt their leadership style to specific individual characteristics of subordinates (Stoker et al., 2001). Leaders need to pay attention to the individual characteristics of subordinates and establish an organisational culture that will reflect the needs of subordinates, allowing them to express their full innovative potential by way of the work they conduct in the organisation.

With regard to *organisational* factors, research literature refers to some general characteristics of organisations, such as size or organisational complexity, as well as other variables such as organisational design, strategy, leadership, human resource practices,

several other support factors, and the organisational culture (Arad, Hanson & Schneider, 1997; West, 1997).

Organisational culture can be defined as the values, beliefs and hidden assumptions that organisation members have in common (Miron, Erez & Naveh, 2004) and have an invaluable role to fulfil in stimulating and facilitating innovative behaviour within organisations. A key aspect with regard to maintaining high levels of innovation within an organisation involves that leaders should implement practices and procedures that will create an innovative organisational culture, thereby encouraging the workforce to act on their innovative potential within the organisational boundaries. A significant positive relationship has been found between organisational culture and innovation (Chang & Lee, 2007) due to the fact that an innovative organisational culture will result in employees embracing innovation as a basic organisational value and accordingly they will foster commitment towards innovation. It needs to be emphasised that an innovative organisational culture will not manifest spontaneously within an organisational context, but would be the outcome of specific practices and procedures considered to be antecedents of innovative behaviour.

Organic organisational structures that provide employees with high levels of flexibility and freedom with regard to the manner in which they choose to conduct their work, have been found to stimulate innovative behaviour (Valencia et al., 2010). The freedom and flexibility resulting from organic organisational structures instil a sense of autonomy and empowerment in employees and will make them more inclined to exhibit innovative behaviour within the organisational context (Arad et al., 1997).

Delegating authority and allowing employee participation in decision-making processes by way of implementing flatter organisational structures and broader spans of control (i.e. less centralisation) will also foster the development of the workforce and equip employees with the necessary skills to assume the risks associated with innovation more appropriately. In contrast, organisations with high degrees of formalisation in the form of excessive rules and regulations (i.e. red tape) will inhibit the ability of employees to act autonomously as these practices will make employees less likely to assume the risks associated with innovative behaviour (Jaskyte & Kisieliene, 2006). Research findings by Martins and Terblanche (2003) indicate that creativity and innovation will result from the implementation of a shared organisational vision and mission grounded in future-oriented innovative principles. This mission and vision furthermore needs to be communicated throughout the entire organisation and the workforce has to be made aware of how the organisation intends addressing the gap between the current situation and the ideal innovation situation reflected by the vision and mission.

Rewards and recognition have an essential role to fulfil in fostering innovative organisational behaviour, more specifically, research literature indicates that innovative organisations rely heavily on personalised intrinsic rewards (Ahmed, 1998), whereas less innovative organisations tend to focus almost exclusively on extrinsic rewards. This being said, extrinsic rewards should not be considered useless for stimulating innovative behaviour in subordinates, on the contrary, a delicate balancing act, whereby rewards are offered in an appropriate internal-external reward ratio will facilitate optimal levels of innovative behaviour in the workforce. Martins and Terblanche (2003) found that innovation will flourish in organisations where personnel are rewarded for taking risks, experimenting and generating new ideas.

The availability of adequate resources in the form of necessary equipment, facilities and time has an essential role to fulfil in establishing an organisational culture that promotes innovative behaviour on the part of the workforce. Time availability is often overlooked as a necessary prerequisite for stimulating innovative behaviour in organisations, much to the detriment of organisations, as time availability could enable employees to consider opportunities for innovation which may be excluded from their normal working schedules (Shepherd, McMullen & Jennings, 2007).

The research findings of Martins and Terblanche (2003) further indicate that an organisational culture supporting open and transparent communication, based on trust, will positively influence the promotion of creativity and innovation within organisations. An organisational context consisting of individuals from diverse backgrounds with different sets of knowledge, skills and abilities will furthermore result in richer and more comprehensive ideas and problem-solving efforts. Recent studies conducted by Goodale, Kuratko, Hornsby and Covin (2011) found that top management support and flexible organisational boundaries significantly predicts positive innovative performance within organisations.

Innovative behaviour is invariably associated with risk, specifically due to the fact that the majority of innovative efforts will be unsuccessful and not yield the intended results. It is essential that unsuccessful innovation efforts will not be viewed as mistakes or failures, but rather learning opportunities for those parties involved. Martins and Terblanche (2003) have found that tolerance of mistakes forms an essential element in the development of an organisational culture that promotes creativity and innovation. Values and norms facilitating innovative behaviour manifests itself in various forms within the organisation and leaders have a critical role to fulfil in establishing values and norms which promote innovative organisational behaviour.

Modern-day organisations are increasingly transforming themselves into learning organisations whereby they establish a learning climate for its workforce and encourage employees to be inquisitive, talk with one another, keep their knowledge and skills up-to-date and acquire new innovative thinking skills. Learning organisations are considered one of the major determinants of innovative behaviour (Garcia-Morales, Llorens-Montes & Verdu-Jover, 2006) due to their ability to create innovation-friendly settings for employees to act on their innovative potential. Working relationships characterised by trust and openness will furthermore establish a sense of emotional safety on the part of employees and will make them more inclined to assume the risks associated with innovative behaviour and act in an innovative fashion (Ahmed, 1998).

An organisational culture that encourages employees to act innovatively, generate new ideas without fear of being criticised, and where the focus is rather on what is supported instead of what is not considered viable, will facilitate innovative behaviour. Similarly, an organisational culture characterised by excessive management control mechanisms will inhibit the risk-taking behaviour of the workforce and consequently stifle innovative efforts by team members (Judge, Fryxell and Dooley, 1997). Innovative organisations emphasise the important role of competitiveness in their organisational culture and continuously motivate employees to generate new ideas and/or concepts that could potentially be transformed into innovative products, services or processes. More often than not this competitiveness will result in conflict between team members and therefore it is essential that conflict is handled in a constructive manner if organisations intend fostering an innovative organisational culture.

As mentioned earlier, the influence of *environmental* factors on the innovative capabilities of organisations is far-reaching and covers several domains. These domains include the current competitive-, supplier-, regulatory-, social-, labour-, customer-, technological- and global environments in which modern-day organisations function. Collectively these domains contribute to a business environment characterised by elements of constant change, uncertainty and high levels of competitiveness. The reality is that if organisations intend to obtain a sustainable competitive advantage over competitors in their industry they will inevitably need to be innovative as innovation is considered the key to success in the current marketplace.

In summary, throughout the foregoing paragraphs it is clear that a wide variety of factors will contribute to the establishment of an innovative organisational culture within organisations. This innovative organisational culture will not manifest spontaneously within the organisational context and it will be the role of leaders to identify, implement and manage the

determinants of innovation in order to establish an innovative organisational culture. It can therefore be concluded that it is critical that leaders in organisations take responsibility for creating an innovative organisational culture, as it requires an act of delicately balancing the organisational culture, structure, resource controls and human resource management systems to facilitate high levels of organisational innovation (Morris, van Vuuren, Cornwall & Scheepers, 2009).

## 2.2 Construct Clarification

The following section will provide a brief overview of the constructs of corporate entrepreneurship, creativity, innovation, as well as the various perspectives on the innovation process.

### 2.2.1 Corporate entrepreneurship

Corporate entrepreneurship refers to the creation and development of an entrepreneurial culture in organisations with the purpose of increasing the firm's innovative capacity (Montoro-Sanchez & Soriano, 2011). Terms frequently used interchangeably with corporate entrepreneurship in research literature includes organisational innovation, as well as intrapreneurship. Several authors emphasise the fact that entrepreneurship is the primary act underpinning innovation (McFadzean, O'Loughlin & Shaw, 2005; Montoro-Sanchez & Soriano, 2011; Morris et al., 2008) and therefore the concept of corporate entrepreneurship have become synonomous with innovation in organisations.

It is important to note that corporate entrepreneurship differs from independent entrepreneurship with respect to several aspects, the most noteworthy difference being that corporate entrepreneurship manifests itself within an organisational context. In order to distinguish more clearly between corporate entrepreneurship and independent entrepreneurship, Table 2.1 below will outline the main differences between the two concepts.

Table 2.1

*The major differences between corporate entrepreneurship and independent entrepreneurship*

| Independent Entrepreneurship | Corporate Entrepreneurship |
|---|---|
| Entrepreneur assumes the risk | Company bears most of the risk, except career-related risk |
| Entrepreneur "owns" the idea and all or much of the business | Company owns the idea and the intellectual property rights |
| Theoretically the rewards for the entrepreneur are unlimited | Limited or no equity is held by the entrepreneur |
| One mistake could mean failure | More room for errors |
| Vulnerable to environmental influences | More insulated against environmental influences |
| Entrepreneur or team of entrepreneurs is relatively independent | Interdependence of intrapreneur with co-workers; may have to share credit with others |
| Can change strategy or direction (flexibility) | Rules, procedures and bureaucracy hinder the entrepreneur's ability to act flexibly |
| Fast decision-making | Longer approval cycles |
| Little security or safety net | Job security and dependable benefit package |
| Few people to talk to or share ideas with | Extensive network for bouncing ideas around |
| Initially limited in scale and scope | Fairly rapid potential for sizeable scale and scope |
| Severe resource limitations | Access to finance, R&D, production facilities for prototypes, distribution channels, and other internal resources |

Note. Adapted from "Corporate Entrepreneurship and Innovation" by M.H. Morris, D.F. Kuratko & J.G. Covin. Ohio: Thomson South-Western.

In order to gain conceptual clarity regarding the construct of corporate entrepreneurship it is essential to understand the three underlying dimensions thereof. The following section will accordingly focus on the three dimensions of corporate entrepreneurship in the form of innovativeness, risk-taking and pro-activeness in more detail.

*Innovativeness* is defined as the seeking of creative, unusual or novel solutions to problems and needs. These solutions may take the form of novel technologies and/or processes, as well as new products and/or services (Dabic, Ortiz-De-Urbina-Criado & Romero-Martinez, 2011). *Risk-taking* involves the willingness of individuals or organisations to commit significant resources to opportunities that have a reasonable chance of costly failure. It should be emphasised that risk-taking with regard to corporate entrepreneurship does not reflect risk of a haphazard nature, but rather a calculated and manageable type of risk. *Proactiveness* is associated with the implementation phase of innovation and doing whatever is necessary to bring an entrepreneurial concept to fruition. These three underlying dimensions will each take place in varying degrees in organisations and will collectively serve as a measure of corporate entrepreneurial activity in organisations - better known as an organisation's level of entrepreneurial intensity.

Corporate entrepreneurship presents itself in different forms and will manifest itself in organisations either by way of corporate venturing (internal, co-operative, external) or strategic entrepreneurship (strategic renewal, sustained regeneration, domain redefinition, organisational rejuvenation, business model reconstruction). While corporate venturing involves organisational involvement in the creation of new businesses, strategic entrepreneurship corresponds to a broader array of entrepreneurial initiatives that will not necessarily involve new businesses being added to the firm.

Corporate venturing includes various methods of creating, adding to, or investing in new businesses (Morris et al., 2008) and can be achieved by way of three implementation modes namely, internal corporate venturing, co-operative corporate venturing and external corporate venturing.

*Internal corporate venturing* entails the creation of new businesses that is owned by the corporation. These businesses will typically reside within the corporate structure of the organisation, but could also be located outside of the organisation and function as semi-autonomous entities. *Co-operative corporate venturing*, also referred to as joint corporate venturing and collaborative corporate venturing, refers to entrepreneurial activity whereby new businesses are created and owned by the corporation together with one or more external development partners (Morris et al., 2008). *External corporate venturing* on its part refers to entrepreneurial activities where new businesses are created by parties outside of the corporation and subsequently invested in and/or acquired by the corporation (Morris et al., 2008).

Strategic entrepreneurship can take one of five forms, namely that of strategic renewal, sustained regeneration, domain redefinition, organisational rejuvenation and business model reconstruction (Covin & Miles, 1999).

*Strategic renewal* refers to a type of entrepreneurship in which the firm "seeks to redefine its relationship with its markets or industry competitors by fundamentally altering how it competes" (Covin & Miles, 1999, p. 52). This is typically reflected by practices whereby an organisation decides to reposition itself within its competitive space by adopting a new strategy. *Sustained regeneration* refers to the entrepreneurial phenomenon whereby a firm "regularly and continuously introduces new products and/or services or enters new markets" (Covin & Miles, 1999, p. 51). Sustained regeneration is regarded as the most common form of strategic entrepreneurship and is primarily utilised for gaining or sustaining a competitive advantage under conditions of changing technological standards, short product-life cycles, or segmenting product categories and market arenas (Morris et al., 2008).

*Domain redefinition* represents another type of entrepreneurship whereby the firm "proactively creates a new product-market arena that others have not recognised or actively sought to exploit" (Covin & Miles, 1999, p. 54). These uncontested and untapped markets in which organisations compete, by way of domain redefinition, is better known as "blue oceans". *Organisational rejuvenation* refers to the entrepreneurial phenomenon where the firm "seeks to sustain or improve its competitive standing by altering its internal processes, structures, and/or capabilities" (Covin & Miles, 1999, p. 52). Successful organisational rejuvenation efforts will enable a firm to obtain a competitive advantage without having to alter its strategy, product offerings, or served markets as the firm's internal processes is the main focus of this strategic entrepreneurship initiative. *Business model reconstruction* finds the firm applying entrepreneurial thinking to the design or redesign of its core business model(s) in order to improve operational efficiencies or otherwise differentiate itself from industry competitors in ways valued by the market (Morris et al., 2008).

Intrapreneurs refer to those individuals in organisations who ensure that ideas develop into added value for the organisation and although intrapreneurs do not necessarily have to be the primary source of the idea, they often are. According to Gaw and Liu (2004) an intrapreneur's primary purpose is to identify the potential value of an idea and passionately champion that idea within the organisation to capitalise on its full value. Similarly, Pinchot and Pinchot (1996) conducted a research study in which they reviewed hundreds of innovation case studies and they were unable to find a single example of a successful innovation effort that did not have at least one intrapreneur championing for its success.

Therefore, it is important to take note of the fact that within research literature the term intrapreneurship is often used interchangeably with that of corporate entrepreneurship.

In summary, organisations exhibiting corporate entrepreneurial activity are considered dynamic, flexible entities that are preparing and/or prepared to take advantage of new business opportunities as they arise (Morris et al., 2008). After extensively reviewing research literature on innovation within organisational contexts many definitions of corporate entrepreneurship came to surface. The different definitions all shared some central themes and accordingly corporate entrepreneurship can be most accurately defined as the effort of promoting innovation from an internal organisational perspective, through the assessment of potentially new opportunities, alignment of resources, as well as exploitation and commercialisation of opportunities (McFadzean et al., 2005).

### 2.2.2 Creativity and innovation

In the available research literature various definitions of creativity and innovation are found and some articles have a tendency to use the constructs of creativity and innovation interchangeably, which is problematic, since it is misleading to the reader. The following section will aim to establish a clear distinction between the constructs of creativity and innovation and additionally illustrate how the two constructs are related to one another.

#### *2.2.2.1 Creativity*

Amabile (1996) states that creativity is the generation of original and useful ideas that will be implemented at a later phase and although creativity is different from that of innovation, it is often considered as either a prerequisite or necessary condition for the facilitation of innovation (West, 2002). After reviewing the research literature, it became apparent that idea generation is considered the key component of creativity and this is corroborated by Titus (2000) who openly refers to creativity as the birth of imaginative and new ideas.

Amabile (1998) furthermore states that a product or response will be considered creative to the extent that it is novel and appropriate, useful, correct or valuable. Gurteen (1998), however, defines creativity as the generation of ideas, whereas innovation is about putting these ideas into action by way of sifting, redefining and implementing them.

In short, creativity is associated with the process of idea generation, as well as learning, and not necessarily directly with the end products, services and/or processes which is generated

from the ideas. Creativity and the processes involved therein will essentially involve the application of divergent thinking skills to produce a wide variety of new ideas. In contrast, innovation will primarily involve the application of convergent thinking skills to sift through the large amount of ideas generated during the creativity phase and accordingly choose the most appropriate and/or cost-effective ideas.

#### *2.2.2.2 Innovation*

Innovation on its part, is considered "...the intentional introduction and application within a role, group or organisation of ideas, processes, products, or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, group, organisation or wider society" (West & Farr, 1990, p.9).

From research literature it becomes apparent that innovation itself is a process consisting of multiple phases and creativity will typically represent the first phase of the innovation process whereby new ideas are formulated. One of the main differences between creativity and innovation involves the fact that innovation involves both the generation and implementation of ideas, whereas creativity merely involves the generation of new ideas.

In order to effectively differentiate between the different types of innovation found within research literature, Varis and Littunen (2010) propose the use of two conceptual approaches.

Firstly, the taxonomy of Schumpeter (1934) should be applied, which will differentiate between the different types of innovation on the grounds of the object undergoing change and will enable one to distinguish between product -, process-, market- and organisational innovations. For the purpose of this proposal the focus will primarily be on product/service - and process innovations due to the fact that these types of innovation feature most prominently in the research literature. *Product/service innovation* entails the introduction of new and/or improved products/services on the part of the organisation. *Process innovation* refers to the introduction of new and/or improved processes in the organisation and will typically be implemented within the internal structure of an organisation.

Secondly, a distinction can be made between the different types of innovation in terms of its "newness" or "radicalness". Hence, it would be possible to distinguish between radical innovation and incremental innovation. As the focus of this proposal is on innovation within organisational contexts (i.e. corporate entrepreneurship) *radical innovation* would typically represent innovations that result in fundamental changes in the activities of an organisation

by departing from existing practices and/or procedures. In contrast, *incremental innovation* will be reflected by innovations which display a lesser degree of departure from existing organisational practices and/or procedures (Varis & Littunen, 2010).

Johannessen, Olsen and Lumpkin (2001) corroborates these statements and defines radical innovation as a departure from existing technology and methods, also referred to as 'disruptive', 'breakthrough' or 'discontinuous' innovation, while incremental innovation is focused on exploiting existing products, processes and/or technologies. In simple terms, one would be able to classify a product/service – and/or process innovation either as radical or incremental on grounds of "how new" the innovation is considered to be.

Within research literature innovation has increasingly been linked positively with organisational growth (Ireland, Hitt, Camp & Sexton, 2001; Yan & Hu, 2008), attaining a sustainable competitive advantage (Brühl et al., 2010; Zhou, Zhang & Montoro-Sanchez, 2011) and successful organisational performance (Carmeli, Gelbard & Gefen, 2010). Considering the positive impact of innovation on different elements of organisational performance it soon becomes evident that innovation has an indespensable role to fulfil in the prosperity of organisations.

#### *2.2.2.3 The innovation process*

Research literature on innovation provides multiple perspectives on the innovation process and more specifically the number of phases included therein. Although these perspectives differ with regard to the number of phases included in the innovation process and the names of these phases differ, some focal characteristics overlap throughout the different perspectives. It will therefore serve useful to obtain a brief overview of the differing perspectives on the innovation process to gain clarity regarding with respect to how they not only differ, but also overlap.

A number of researchers contend that the innovation process consists of two phases, for example creativity and innovation (West, 2002), idea generation and idea promotion (Howell & Boies, 2004) or creative thinking and convergent thinking (Gurteen, 1998).

Other researchers suggest that the innovation process consists of three phases, for instance idea generation and crystallisation, development and demonstration, as well as investment and preparing for launch (Verloop, 2004) or ideation, incubation and demonstration (Narvekar & Jain, 2006). Similarly, Scott and Bruce (1994) identified three phases in the innovation process. During the first phase an individual recognises a problem or opportunity

and develops a new or adopted idea to address the problem/opportunity sufficiently. During the second phase an individual will aim to promote his/her ideas by seeking support in- and outside of the organisation and during the third phase the application of ideas will result in the production of the innovation prototype/model. McFadzean et al., (2005) also claims that the innovation process model consists out of three separate phases namely, idea generation, problem-solving, as well as implementation and diffusion, with each of these three phases divided up further into two sub-phases. The idea generation phase therefore consists of the recognition of a need and idea formulation, while the problem-solving phase consists of the phases of design and evaluation of a prototype solution. The third phase, implementation and diffusion, consist of the commercial development/manufacturing and marketing phases respectively.

McAdam and McClelland (2002) propose that the innovation process consists of four distinct phases. During the first phase, idea generation, ideas are developed and will be followed by the second phase of screening where ideas are compared to the organisation's objective to determine whether the ideas and organisational objective are compatible. The third phase entails checking the commercial and technical feasibility of the idea and during the fourth phase of implementation the idea is commercialised.

In summary, from the paragraphs above it is clear that although various perspectives exist regarding the number of phases/phases included in the innovation process there is considerable overlap with regards to the different perspectives. For the purpose of this thesis the four-phase innovation process model of McAdam and McClelland (2002) will be adopted due to its compressive nature and ability to express the various phases within the innovation process in detail. Section 2.5 of this chapter will elaborate on the manner in which the competencies of leaders (i.e. knowledge, skills and attitudes) will be linked to each of the different phases in the innovation process.

## 2.3 Leadership as a Predictor of Innovation

Organisations such as Apple (Steve Jobs), Amazon.com (Jeff Bezos) and the Virgin Group (Richard Branson) are not only regarded as some of the most reputable organisations in the world, but are also synonomous with innovative business practices and/or procedures. Although these organisations differ greatly from one another in terms of the different products/services they offer and target markets they serve, they have a focal characteristic in common and it involves the fact that at the helm of each of these organisations is an innovative leader.

Leadership is regarded by some as one of the most influential predictors of innovation within organisational contexts (Mumford et al., 2002) and several studies have found that effective leadership is vital for successful innovation efforts in organisations (Jansen et al., 2009; Nemanich & Vera, 2009; Yukl, 2009).

Similarly, a survey conducted by Barsh et al. (2008) on global business executives, middle managers and professionals in various industries pointed to leadership as the best predictor of an organisations' innovative performance. In the survey, respondents, who regarded their organisations to be more innovative than other organisations in the industry, rated the leadership capabilities within their organisation as "strong" or "very strong". Conversely, respondents who thought the innovative ability of their organisation was below average rated their organisations' leadership capabilities as "significantly lower", and in some cases even as "poor".

A number of different leadership styles have been positively associated with organisational innovation and includes contextual leadership (Marion & Osborn, 2009), strategic leadership (Makri & Scandura, 2010), ambidextrous leadership (Rosing et al., 2011) and rotating leadership (Davis & Eisenhardt, 2011) to name but a few. A comprehensive overview of research literature revealed that of all leadership styles, transformational leadership has been most prominently associated with increased levels of innovation within organisational contexts (Jung, Chow & Wu, 2003; Osborn & Marion, 2009; Hsiao & Chang, 2011; Mokhber, Wan Ismail & Vakilbashi, 2011).

During the last decade, leadership research and theory has focused less on general leadership styles and paid more attention to the importance of situational variability and flexible leadership behaviour (e.g., the path-goal theory of leadership; House, 1971) as well as leadership behaviour that is specifically tuned to individual subordinates (leader-member exchange theory; Graen & Uhl-Bien, 1995).

In summary, from reviewing research literature it is evident that not only is transformational leadership associated with innovation, but it additionally shares multiple similarities with other leadership styles positively associated with innovation. In order to gain a full understanding of the complex process whereby leaders manage to influence their subordinates to engage in innovative behaviours, it is essential to focus on the theory of transformational leadership and other associated leadership theories.

### 2.3.1 Transformational leadership as a predictor of innovation

Rubin, Munz and Boomer (2005) mention that "Transformational leadership behaviour represents the most active/effective form of leadership..." (p. 845). In addition, a number of studies associate transformational leadership with increased levels of innovation within organisations (Dionne, Yammarino, Atwater & Spangler, 2004; Garcia-Morales et al., 2008; Jung et al., 2003; Osborn & Marion, 2009, etc). From extensively reviewing research literature it became apparent that transformational leadership is the most dominant and widely researched leadership style associated with innovation.

Transformational leadership consists of four unique, but interrelated behavioural components which collectively influence subordinates' willingness to engage in innovative behaviour. These four behavioural components take the form of idealised influence/charisma, inspirational motivation, intellectual stimulation and individualised consideration.

*Idealised influence/charisma* entails that the leader has become an idealised influence or "role model" for those around him/her (Kirkbride, 2006), either because he/she exhibits certain personal characteristics or "charisma" or because he/she demonstrates certain moral behaviours. This behaviour arouses strong follower emotions and identification with the leader (Yukl, 2010) due to the fact that leaders are perceived to be high on morality, trust, integrity, honesty and purpose.

In terms of idealised influence/charisma, transformational leaders will provide a sense of purpose to the innovative effort at hand and this will result in subordinates building identification with the leader and the articulated vision. Transformational leaders inspire their subordinates to realise what they are able to accomplish through extra effort and they assist subordinates in finding opportunities in situations which appear to be threatening and assist subordinates in overcoming problems seen as insurmountable (Bass & Avolio, 1990). Idealised influence/charisma has a critical role to fulfil throughout the innovation process as multiple challenges will occur in both the idea generation and implementation phases of the innovation process. It will therefore be essential that leaders draw on their ability to display idealised influence/charisma and encourage subordinates to be persistent and tenacious in overcoming the challenges encountered during the innovation process.

*Inspirational motivation* refers to the ability of a transformational leader to motivate his/her subordinates to achieve superior performance (Kirkbride, 2006). These leaders are able to articulate, in an exciting and compelling manner, a vision of the future that subordinates accept and strive towards. These leaders often succeed in elevating the expectations of

subordinates, resulting in subordinates achieving more than they, or others, thought they were able to do – known as the Pygmalion effect.

By way of articulating a compelling vision, transformational leaders will instil a sense of inspirational motivation in their subordinates. While articulating this vision, leaders will make use of symbolic actions and persuasive language to promote his/her vision with the purpose of stimulating enthusiasm, building confidence and increasing the intrinsic motivation of subordinates (Bass & Avolio, 1990). Inspirational motivation has a critical role to fulfil in the innovation process and more specifically during the start of the innovation process which is characterised by periods of adversity. The initial phases of the innovation process, specifically the idea generation phase, is characterised by high levels of uncertainty and therefore it is essential that leaders instil a sense of enthusiasm and trust in their subordinates as high levels of uncertainty will hinder the innovative efforts of subordinates.

*Intellectual stimulation* entails that a leader stimulates his/her subordinates to think through issues and problems for themselves and thereby assist them in developing their own abilities (Kirkbride, 2006). Throughout this process the leader fosters creativity, stresses rethinking and re-examines underlying assumptions (Bass & Avolio, 1990).

With regard to intellectual stimulation, transformational leaders will stimulate innovative behaviour in subordinates by questioning their assumptions, challenging the status quo and promoting principles such as problem reformulation, imagination, curiosity and novel approaches. Intellectual stimulation will have an essential role to fulfil throughout the innovation process due to its importance in stimulating the intellectual functioning of individuals. It is especially during the idea generation phase, that leaders need their subordinates to generate as many new ideas as possible, that intellectual stimulation particularly has an essential role to fulfil.

*Individualised consideration* involves that leaders concentrate on recognising the variations that exist in the skills, abilities and growth opportunity desires of their subordinates. This will enable a leader to provide personal attention, treat each follower individually, provide individual feedback, delegate, counsel, guide, coach and advise subordinates according to their individual needs. In doing this, a leader will raise the needs and confidence levels of subordinates to take on greater levels of responsibility (Bass & Avolio, 1990).

By way of individualised consideration, transformational leaders will identify the unique growth and developmental needs of subordinates and accordingly provide the necessary coaching and mentoring to subordinates to address their specific needs. Individualised consideration has a critical role to fulfil throughout the innovation process – specifically due

to the complex and dynamic needs of subordinates. The personalised attention that individualised consideration offers to subordinates has an influential role to fulfil in the willingness of subordinates to exert effort with regard to innovative initiatives. Stated more simply, if subordinates feel that their individual efforts and needs are valued by leaders, they will be more likely to exert effort with regard to innovation initiatives, such as expressing their ideas and challenging the status quo.

Theories most prominently associated with transformational leadership in research literature includes the componential theory of organisational creativity and innovation (Amabile, 1997), the path-goal theory (House, 1996), as well as the leader-member exchange theory (Graen & Uhl-Bien, 1995). By studying each of these theories in-depth, we would be able to gain insight into the complex process whereby leaders manage to influence their subordinates to act innovatively

### 2.3.2 The componential theory of organisational creativity and innovation

The componential theory of organisational creativity and innovation assume that all individuals with normal capacities will be able to produce at least moderate creative work in some domain, some of the time – and that the social environment (work environment) can influence both the level and frequency of an individual's creative behaviour (Amabile, 1997).

In terms of individual (or small team) creativity, the componential theory of organisational creativity and innovation model includes three components which are considered necessary for creativity in any given domain. This includes expertise, creative-thinking skills as well as intrinsic task motivation and is presented in Figure 2.1 below.

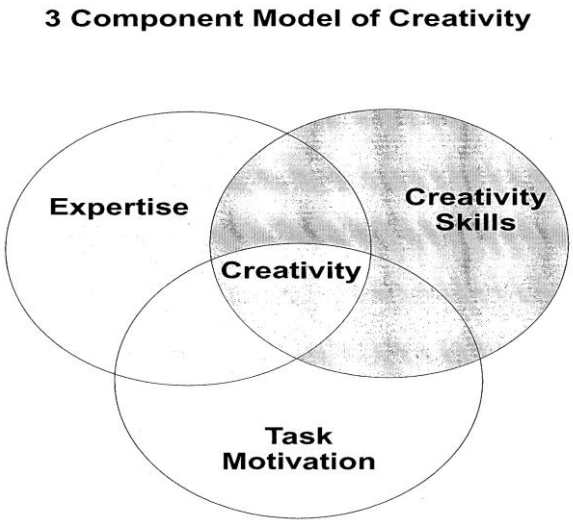


*Figure 2.1* The three component model of creativity. Adapted from "Motivating creativity in organisations: On doing what you love and loving what you do" by T. M. Amabile, 1997, California Management Review, 40(1), 39-58, p.43. Copyright 1997 by the California Management Review.

*Expertise* is considered the foundation of all creative work and includes memory for factual knowledge, technical proficiency, and special talents in the target work domain (Amabile, 1997). Expertise, more specifically technical expertise, is considered an essential element of effective leadership in research literature, as it not only provides a basis for structuring ill-defined problems/challenges, but also due to the fact that it provides credibility to leaders that will allow them to exercise influence over their subordinates.

*Creative thinking skills* represents a cognitive thinking style that favours taking new perspectives on problems, applying techniques for the exploration of new cognitive pathways and a working style conducive to a persistent, energetic pursuit of one's work (Amabile, 1997). An individual's creative thinking skills will depend to some extent on his/her personality characteristics related to independence, self-discipline, tolerance for ambiguity, orientation towards risk-taking, a relative lack of concern for social approval and perseverance in the face of frustration. Therefore, given the ill-defined nature of creative work and the novelty of creative problem solutions, it may be difficult, if not impossible, to evaluate ideas and provide meaningful feedback to subordinates if leaders lack creative thinking skills.

While expertise and creative thinking skills determine what an individual is capable of doing in a given domain, task motivation determines what the individual ultimately will do.

*Intrinsic task motivation* refers to the phenomenon whereby individuals are driven by a deep interest and involvement in the task, curiosity, enjoyment and/or a personal sense of

challenge (Amabile, 1997). Task motivation will determine to what extent an individual will apply his/her expertise and creative thinking skills in service of a creative project/task.

Individuals with high levels of intrinsic motivation will be more likely to draw on skills from other domains and/or apply greater effort in acquiring skills considered necessary for engaging in creative work. It is the responsibility of leaders to stimulate and maintain high levels of intrinsic motivation in their subordinates as it would result in increased performance on the part of subordinates. Leaders will utilise a wide variety of methods to increase the intrinsic motivation of subordinates and this will include, but not be limited to, providing subordinates with work tasks/projects that are challenging and cognitively stimulating, as well as allowing subordinates ample flexibility and autonomy in the way they choose to conduct their work assignments.

In terms of the work environment, the model depicts organisational components considered necessary for innovation namely, organisational motivation to innovate, resources and management practices.

Figure 2.2 below depicts the main elements of the componential theory in a simplistic fashion, namely the integration of individual creativity and the organisational work environment. The fundamental assumption underlying this theory states that elements within the work environment will have an impact on an individuals' level of creativity (depicted by the solid arrow). Furthermore, the theory proposes that creativity produced by individuals and teams of individuals will serve as a primary source of innovation within the organisation (depicted by the dotted arrow). The most significant feature of the theory is the assertion that the social environment (work environment) influences creativity by influencing the individual components.

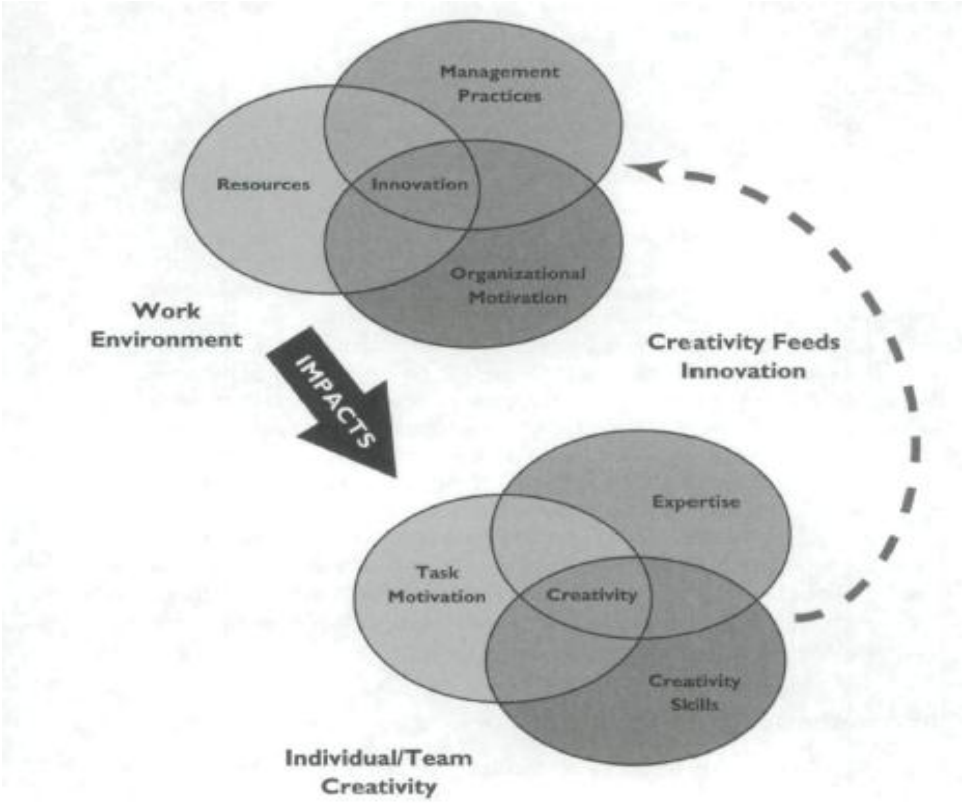


*Figure 2.2* The componential theory of organisational creativity and innovation. Adapted from "Motivating creativity in organisations: On doing what you love and loving what you do" by T. M. Amabile, 1997, California Management Review, 40(1), 39-58, p.53. Copyright 1997 by the California Management Review.

*Organisational motivation to innovate* represents the basic orientation of an organisation towards innovation and includes all the various forms of support for creativity and innovation throughout the organisation (Amabile, 1997). Leaders in organisations, both from senior - and middle management, have an integral role to fulfil in conveying an organisation's orientation towards innovation. Leaders will express an organisation's stance on innovation to its subordinates by communicating and advocating the organisation's vision regarding innovation – typically reflected by way of the inspirational motivation dimension of the transformational leadership theory.

Amabile (1997) states that the most important elements of an organisation's orientation towards innovation should include value placed on creativity and innovation in general; an orientation towards risk and challenging the status quo; a sense of pride in team members and enthusiasm regarding what they are capable of doing, as well as taking an offensive strategy which is future-oriented (versus a defensive strategy of simply protecting the organisation's past position). Transformational leadership behaviours associated with the

promotion of an organisation's orientation towards innovation (as illustrated above) will typically be displayed by way of intellectual stimulation and individualised consideration.

*Resources* will include everything an organisation has available at its disposal to assist work in the innovation domain of the organisation. These resources will typically include a wide variety of elements including individuals with the necessary expertise; sufficient time availability for producing novel ideas; adequate funds allocated for creativity and innovation purposes; material resources; required systems and processes; relevant information; the availability of training and so forth (Amabile, 1997).

*Management practices* will involve management at all organisational levels, but in this case more specifically at the level of individual departments and projects. A study conducted by Amabile (1997) found that several aspects of project supervision is important for facilitating creativity and innovation, namely the ability to set clear overall project goals; allowing employees freedom and autonomy when completing their work; clear planning and feedback; sufficient communication between the superior and the work group, as well as enthusiastic support for the work of individuals. In terms of the transformational leadership theory, the dimensions of intellectual stimulation and individualised consideration will have an influential role to fulfil in management practices that support creativity and innovation within the organisation.

In summary, the componential theory of organisational creativity and innovation is the only organisational creativity theory which specifies broad features of leader behaviour contributing to perceived work environments for creativity. More specifically, the theory proposes that positive supervisory behaviours will entail that leaders serve as good work models; plan and set goals appropriately; support the individual/work group in the organisation; value individual contributions to the project/task at hand; provide constructive feedback; show confidence in the individual/work group and will be open to new ideas (Amabile, 1997).

From the componential theory of organisational creativity it is clear that the features of leader behaviour that will contribute to creativity and innovation within the organisational context will invariably present itself in one of the four dimensions of transformational leadership (i.e. intellectual stimulation, individualised consideration, idealised influence/charisma and inspirational motivation). This clearly illustrates why transformational leadership is regarded the most prominent leadership theory associated with innovation and also why it serves as a useful point-of-departure from which to conduct research studies with regards to leadership and innovation.

### 2.3.3 The path-goal theory of leadership

The path-goal theory is a dyadic theory of supervision and concerns the relationship between formally appointed superiors and subordinates in their day-to-day functioning (House, 1996). It is a dyadic theory of supervision in that it does not address the effect of leaders on groups or work units, but rather the effects of superiors on the motivation and satisfaction of subordinates (House, 1996). The theory makes the assumption that leader behaviour needs to match the situation of subordinates in order to be effective and according to House (1971, p. 324) "the motivational function of a leader consists of increasing personal payoffs to subordinates for work-goal attainment and making the path to these payoffs easier to travel to by clarifying it, reducing roadblocks and pitfalls, and increasing the opportunities for personal satisfaction en route."

In a later version of the path-goal theory House and Mitchell (1974) advanced two general propositions of the theory. Firstly, House and Mitchell (1974, p.84) propose that "...leader behaviour is acceptable and satisfying to subordinates to the extent that the subordinates see such behaviour as either an immediate source of satisfaction or instrumental to future satisfaction." Secondly, House and Mitchell (1974, p.84) state that "...leader behaviour is motivational, i.e., increases effort, to the extent that (a) such behaviour makes satisfaction of subordinate's needs contingent on effective performance and (b) such behaviour complements the environment of subordinates by providing coaching, guidance, support and rewards necessary for effective performance."

The central assumption underlying the path-goal theory states that superiors will be effective to the extent that they complement the environment in which their subordinates work with the necessary cognitive clarifications to ensure that subordinates expect they can attain work goals and more importantly that they will experience intrinsic satisfaction and receive appropriate rewards when attaining these work goals. If the environment does not provide clear casual linkages between effort and goal attainment and/or between goal attainment and extrinsic rewards, it is the responsibility of the leader to establish these linkages. Similarly, should subordinates lack the necessary support or resources to accomplish work goals then it will be the responsibility of the leader to provide the necessary support and resources (House & Mitchell, 1974).

The expectancy theory of motivation (Vroom, 1964) should be used in conjunction with the path-goal theory as it provides insight into the process whereby leaders manage to influence the satisfaction and effort of their subordinates. In terms of the expectancy theory, work motivation is regarded as a rational choice process where an individual decides how much

effort to devote to his/her job at a specific point in time. Deciding between a maximal effort and a minimal (or moderate) effort, an individual considers the likelihood that a given level of effort will result in successful completion of a task and the likelihood that task completion will result in desirable outcomes (e.g., recognition, higher pay, promotion, sense of achievement, etc) while avoiding undesirable outcomes (e.g., layoffs, reprimands, excessive stress, accidents, etc). This perceived probability of an outcome is referred to as *expectancy*, while the desirability of an outcome is known as the *valence*.

Therefore, according to the expectancy theory of motivation (Vroom, 1964), leaders will have the ability to have a significant impact on the amount of effort subordinates choose to exert on innovative task/projects. Leaders should thus be aware of the fact that by implementing initiatives such as providing recognition to subordinates, offering challenging and stimulating work assignments, providing satisfactory sources of remuneration to subordinates, and so forth, they will be able to determine the amount of effort subordinates choose to exert on innovative task/projects within the work context.

The path-goal theory distinguishes between four types of leader behaviours that will have an impact on the amount of satisfaction and effort subordinates choose to display, depending on the features of the situation at hand. These situational moderator variables will include the task, environment and follower characteristics of the specific situation at hand as depicted in Figure 2.3 below.

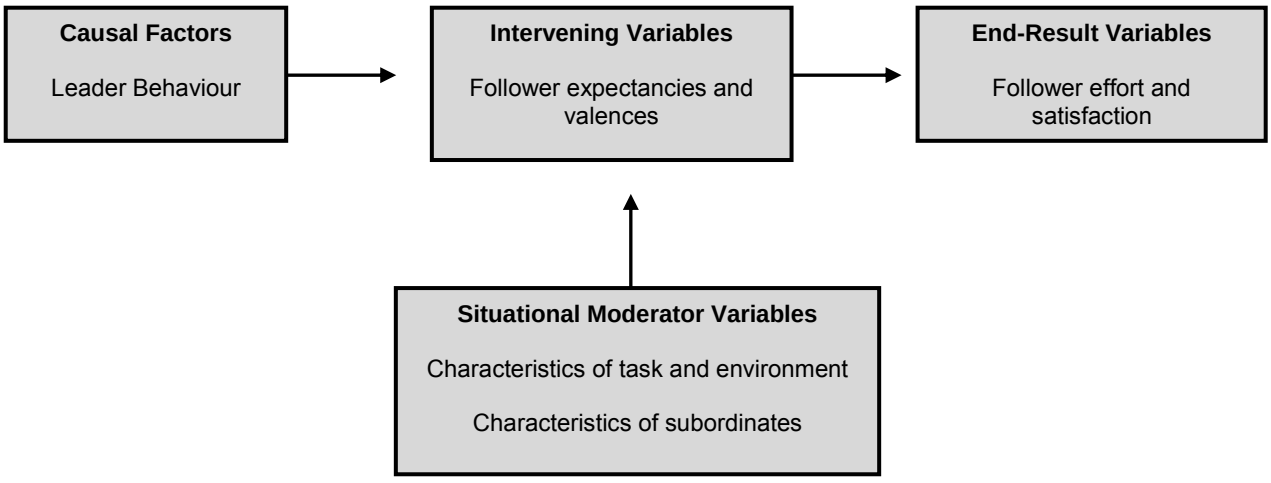


*Figure 2.3* Causal relationships in the Path-Goal Theory of Leadership. Adapted from "A path goal theory of leader effectiveness" by R.J. House. In G Yukl (Ed.), Leadership in Organizations (p.295). Upper Saddle River, NJ: Pearson.

*Supportive leader behaviours* refer to behaviour aimed at satisfying the needs and preferences of subordinates, such as displaying concern for the welfare of subordinates and establishing a work environment that is both friendly and psychologically supportive. House and Mitchell (1974) assert that supportive leader behaviour is a source of self-confidence, social satisfaction and a source of stress reduction that alleviates the frustration of subordinates. Supportive leadership behaviour reflects several aspects of the individualised consideration dimension of transformational leadership due to its emphasis on attending to the welfare and needs of individual subordinates.

*Directive leader behaviours* represent behaviour directed towards providing psychological structure for subordinates: letting subordinates know what they are expected to do; scheduling and coordinating work; giving specific guidance and clarifying policies, rules and procedures (House & Mitchell, 1974). Due to the emphasis on providing a sense of direction and support to subordinates, it can be argued that elements of directive leader behaviours are reflected in the idealised influence/charisma dimension of transformational leadership.

*Participative leader behaviours* refer to behaviours aimed at encouraging the influence of subordinates in decision-making processes, as well as work unit operations by way of consultation with subordinates and taking their opinions and suggestions into account when decisions are made. Participative leader behaviour has been asserted to have four effects:

1. to clarify path-goal relationships concerning effort and work attainment, as well as work-goal attainment and extrinsic rewards;

2. to increase congruence between subordinate goals and organisational goals, because under participative leadership subordinates would have influence concerning their assigned goals and therefore select goals they highly value;

3. to increase subordinate autonomy and ability to carry out their intentions, thus leading to greater effort and performance;

4. to increase the amount of pressure for organisational performance by increasing subordinate involvement and commitment and by increasing social pressure of peers (House & Mitchell, 1974).

The emphasis placed on paying attention to the opinions and suggestions of individual subordinates clearly reflects elements displayed within the individualised consideration dimension of transformational leadership.

*Achievement-oriented leader behaviours* entail behaviour directed towards encouraging performance excellence by establishing challenging goals; seeking improvement emphasising performance excellence, and displaying confidence that subordinates will attain high performance standards. The focus on continuously improving performance overlaps to a large extent with certain aspects of the inspirational motivation component of transformational leadership.

It should be noted that in Figure 2.3 situational moderator variables will not only determine the potential for increased follower motivation, but also the manner in which the leader will have to act if he/she intends increasing the motivation of subordinates. In essence, situational moderator variables will influence the preference of subordinates for a particular type of leadership behaviour and this specific preference will impact on the satisfaction of subordinates (Yukl, 2010).

In summary, despite being contextualised differently, the four leader behaviours depicted within the path-goal theory show clear overlap with the dimensions included in the transformational leadership theory. The strong overlap between elements of the path-goal theory and the transformational leadership theory would indicate the value of the path-goal theory in understanding the manner in which leadership behaviour will stimulate and facilitate innovative behaviour in subordinates. The central assumption underlying the path-goal theory, namely that leader behaviour need to match the specific situation of subordinates to be effective, is noteworthy and illustrates the importance of leaders adapting their knowledge, skills and attitudes throughout the innovation process to successfully stimulate and facilitate innovation in their subordinates.

### 2.3.4 Leader-member exchange theory

The main assumption of the leader-member exchange theory (Graen & Uhl-Bien, 1995) entails that leaders establish different quality relationships with their subordinates as both parties mutually define the subordinate's role. Graen and Cashman (1975) propose that exchange relationships are formed on the basis of personal compatibility, subordinate competence and dependability.

Over a period of time, leaders will establish either high-exchange or low-exchange relationships with their subordinates. High-exchange relationships with subordinates are established on the basis of the leader's control over outcomes that are considered desirable to subordinates. Yukl (2010) states that these outcomes will include the assignment of

interesting and desirable tasks, delegation of greater responsibility and authority, more sharing of information, participation in decision-making processes, tangible rewards such as a pay increase, special benefits (e.g., better work schedule, bigger office), personal support and approval, and facilitation of the follower's career (e.g., recommendation for a promotion, giving developmental assignments with high visibility).

High-exchange relationships between leaders and their subordinates will develop gradually over time through the reciprocal reinforcement of behaviour as the exchange cycle is repeated continuously. Essentially, high-quality leader-member exchange relationships are characterised by high levels of mutual trust, respect, and obligation, whereas low-quality leader-member exchange relationships are characterised by low levels of the same construct (Graen & Uhl-Bien, 1995).

High-quality exchange subordinates will have to attend to additional obligations and/or costs due to their increased status, influence and benefits. Furthermore, it is expected of high-quality subordinates to work harder, be more committed to task objectives, be loyal to his/her leader and contribute to the administrative duties of the leader.

One of the most noteworthy outcomes of high-quality leader-member exchange relationships is the high levels of commitment and trust that develop between leaders and their subordinates. Trust and commitment on the part of subordinates, which will be addressed more comprehensively in following sections, are considered essential components for the facilitation of high levels of innovative behaviour in subordinates. Leader-member-exchange should therefore be positively related to creativity and innovation due to the fact that subordinates in high-quality leader-member exchange relationships may be inclined to trust their leader and to risk something new, more so than subordinates engaging in low-quality leader-member exchange relationships with their leaders (Rosing et al., 2011).

The integration of five different research studies performed on leader-member exchange at individual level revealed that leader-member exchange displayed a moderate, though consistent positive relationship with innovation (Rosing et al., 2011).

In summary, the leader-member exchange theory indicates that leaders, by way of the outcomes they have control over, will have the ability to establish either high – or low quality leader-member exchange relationships with their subordinates. High-quality relationships are characterised by increased levels of trust and commitment among leaders and their subordinates, components regarded essential for stimulating and facilitating high levels of innovation in subordinates. From the theory it is clear that leaders will need to apply the outcomes they have control over in appropriate ways should they wish to establish high-

quality exchange relationships with their subordinates as this will result in increased levels of innovation.

### 2.4 Critical Roles Fulfilled in the Innovation Process

The innovation process is inherently filled with various challenges and obstacles. Team members will need to fulfil various roles and responsibilities to ensure that successful progression is made through each of the four phases in the innovation process. Roberts and Fusfeld (1980) identified five critical work roles that will arise in differing degrees throughout the innovation process and will need to be fulfilled by team members in order for innovation efforts to be successful.

It should be noted that these five roles will arise in differing degrees throughout the four phases of the innovation process. The five roles are furthermore not mutually exclusive – on the contrary – team members will, more often than not, be required to fulfil multiple roles simultaneously during the course of the innovation process. Different innovation projects will invariably require variations in the required role mix at each phase of the innovation process. Nevertheless, all five work roles must be carried out by one or more individuals if the innovation process is to pass effectively through all four its phases/phases (Roberts & Fusfeld, 1980). Although these five roles are not exclusively performed by team leaders, it will become clear to the reader that the majority of team leaders will invariably take up these roles due to the high levels of responsibility they assume during innovative projects.

The following section will aim to illustrate how each of the five roles, as depicted by Roberts and Fusfeld (1980), are inherently unique and will ultimately necessitate different sets of competencies in the form of knowledge, skills and attitudes on the part of team members. A deficiency in any one of these five work roles could potentially result in the unsuccessful completion of the innovation process and will have negative implications for the innovative efforts of organisations as a whole.

The following section will provide a brief overview of the five work roles that will need to be fulfilled by team members during the innovation process. Additionally, the unique contribution and importance of each with regard to successful completion of the innovation process will also be discussed.

### 2.4.1 Idea generator

The idea generator role is inherently of a facilitative nature due to the fact that team members functioning in the idea generator role are less focused on producing new ideas themselves, but rather concerned with implementing specific practices/procedures that will enable other team members to generate new ideas more effectively. The access leaders has to resources, which are often considered essential for idea generation efforts, due to their authority position, might provide insight into the fact that leaders often fulfil the idea generator role during the innovation process. In the idea generator role team members will analyse/synthesise both formal and informal information regarding the markets, technologies, approaches and procedures relevant to their specific industry with the objective of generating new and/or improved products, services, processes or solutions to challenging problems (Roberts & Fusfeld, 1980).

Roberts and Fusfeld (1980) state that the extent to which an organisation and its team members are thinking about new and different ways of doing things (i.e. challenging the status quo) will serve as a measure as to how well the idea generator role is performed within that specific organisation.

### 2.4.2 Entrepreneuring or championing

In this role team members recognise, propose, push and demonstrate a new and/or improved idea, product, service, process or approach with the objective of gaining approval from formal management (Roberts & Fusfeld, 1980). The authority and credibility of team members in leadership positions, as well as access to formal management due to the networking capabilities of most leaders, might provide insight into the fact that leaders often fulfil the entrepreneuring/championing role within organisations. Experience has for instance shown that even a very strong idea (e.g. 3M's PostIt Notes®) will not advance in larger modern organisations unless it is headed by someone championing for its success.

Roberts and Fusfeld (1980) state that pools of unexploited ideas that seldom come to a manager's attention would typically indicate that the entrepreneuring/championing role is not fulfilled satisfactorily within the organisation.

### 2.4.3 Project leading

In this role team members plan and co-ordinate all the diverse sets of activities and individuals involved in moving an innovative idea into practice. The individual(s) functioning in this role should provide the necessary planning and organising for the project to ensure that all administrative requirements for the project are met, provide the necessary coordination among team members and balance the goals of the organisation with the needs of the organisation (Roberts & Fusfeld, 1980). The fact that individuals in leadership positions are often most familiar with the goals and needs of the organisation, might explain why leaders regularly fulfil the role of project leaders in organisations. The contrary is also true, the large amount of emphasis placed on administrative duties in this role – which are often considered mundane and a waste of time for leaders – also discourage many leaders from taking up this role and delegating it to other members of their team.

Roberts and Fusfeld (1980) indicate that project leading on the part of team members are suspect if schedules are not met, activities fall through the cracks (e.g. coordination with a supplier), individuals do not have a sense of the overall goal of their work, or units which are needed to support the work back out of their commitments.

### 2.4.4 Gatekeeping

The organisation member(s) fulfilling this role will keep him/herself informed of organisation-related developments occurring outside of the realms of the organisation by way of journals, conferences, colleagues and benchmarking initiatives with similar organisations (Roberts & Fusfeld, 1980). Individuals in the gatekeeping role will pass information on to his/her colleagues and essentially function as an information resource for other individuals in the organisation, by serving as an authority on whom to see, and/or indicating what has been done thus far in the innovation process. Individuals in this position might additionally be required to provide informal co-ordination among team members with regard to innovative efforts. While the majority of leaders in organisations will be up-to-date with developments occurring in the external environment of the organisations, many leaders will not serve as an information resource to other team members as a result of the time-consuming nature of this specific role.

Roberts and Fusfeld (1980) indicate that the gatekeeping function is performed inadequately if news of changes in the market, technology or government legislation comes without warning, or if individuals in the organisation are not getting the information they need due to

the fact that it has not been passed onto them. Should an organisation come to realise, six months after a project is completed, that they have succeeded in reinventing a competitor's product/service, then obviously the gatekeeping function was not performed satisfactory.

### 2.4.5 Sponsoring or coaching

Team members functioning in the sponsor/coaching role will assist with the development of less-experienced talent in the organisation. In this role specific team members will provide encouragement, guidance and act as a sounding board to the project leader, as well as other team members. The sponsor/coach will additionally assist the project team in gaining access to resources it may require from other parts of the organisation in order to bring an innovative concept and/or idea to fruition. In some cases, the sponsor/coach may even act as a "bootlegger" of the funds considered necessary for the successful completion of an innovation project (Roberts & Fusfeld, 1980).

The sponsor/coach role is often fulfilled by senior-level individuals in the organisation possessing considerable expertise and experience in specific fields of interest. This role is informally referred to by many as the "big brother" role and the essential function it has to fulfil in the development of an organisation's most valuable asset – its workforce – may provide some insight into the reason why leaders more often than not decide to assume the role of sponsors/coaches themselves rather than delegating this function (Roberts & Fusfeld, 1980).

Roberts and Fusfeld (1980) mention that inadequate and/or inappropriate sponsoring or coaching often explain why certain projects get pushed into application too soon, why some project managers have to spend too much time defending their work, or why team members complain that they do not know how to "navigate the bureaucracy" of their organisation.

In summary, it should be noted that the importance and relevance of each of the five critical work roles will differ as the innovation project progress through the various phases in the innovation process. Initially, the idea generator role will be crucial as ideas generated during this phase will ultimately provide input for the remaining phases of the innovation process. As the project evolves, entrepreneurial skill and commitment becomes important to develop the idea into a viable product/service or process. Once the project is established, good project leading and/or managing will be required to guide its progress. It should hence be clear that the need for each critical role does not abruptly appear and disappear - instead the

need grows and diminishes, being a focus at some point, but of lesser importance at others (Roberts & Fusfeld, 1980).

In order for team members, and specifically leaders, to fulfil each of the five critical roles mentioned above satisfactorily, individuals will need to possess specific competencies in the form of knowledge, skills and attitudes considered essential for successful performance in each of the five roles. The following section will aim to provide in-depth insight of the competencies which is considered essential for effective leadership performance with reference to the four phases in the innovation process.

### 2.5 Linking Leadership Knowledge, Skills and Attitudes to the Innovation Process

By examining leadership in terms of the various phases in the innovation process, a picture soon emerges of a whole range of critical roles and responsibilities leaders will need to fulfil during the innovation process. By taking this somewhat unusual approach, it will be possible to generate a list that provides – and more importantly prescribes – an operational taxonomy which reflects the types of leadership knowledge, skills and attitudes considered necessary to elicit innovative behaviour in subordinates.

Within research literature, various definitions of KSA's exist with some researchers referring to KSAOS as knowledge, skill, ability and other personal characteristics, while other scholars define the term KSA as knowledge, skills and attitudes (Spector, Greer & Youngblood, 2005). The latter definition will be adopted for this thesis and will specifically refer to KSA's as the knowledge, skills and attitudes required for successful job performance.

The Oxford dictionary (2012) defines knowledge as "facts, information, and skills acquired through experience or education; the theoretical understanding of a subject." In simple terms, knowledge reflects what an individual knows that is relevant to a specific task.

According to the Oxford dictionary (2012) a skill is defined as "the ability to do something well" and refers to an individual's current level of proficiency on a particular job, which can either be mental or physical, although most tasks involve elements of both.

The Oxford dictionary (2012) defines attitude as "a settled way of thinking or feeling about something." Attitude consists out of three components and includes cognition which reflects what an individual believes, affect which reflects how an individual feels, and behavioural intentions which indicate how an individual intends to act.

The four-phase innovation process model of McAdam and McClelland (2002) has been adopted for this research study due to the sophistication it provides in establishing a linkage between specific leadership competencies and the various phases in the innovation process.

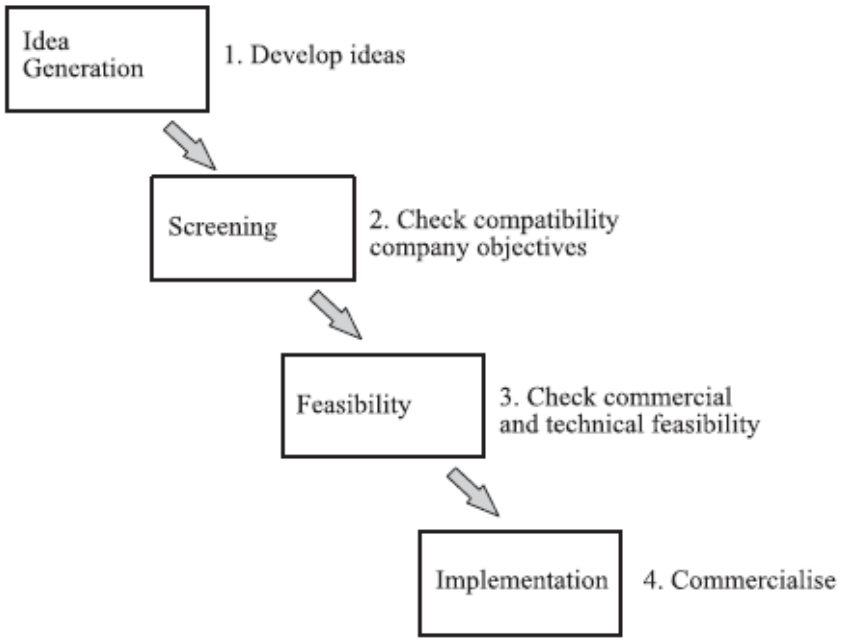


*Figure 2.4* The four-phase innovation process model Adapted from "Individual and team-based idea generation within innovation management: Organisational and research agendas" by R McAdam & J McClelland, 2002, *European Journal of Innovation Management*, *5*(2), 86-97, p.87. Copyright 2002 by the European Journal of Innovation Management.

Innovative products, services and/or processes will be the outcome(s) of a leader and his/her subordinates advancing successfully through each of the four phases included in the innovation process.

In theoretical terms, the innovation process as a whole can be most accurately defined by way of a funnel-like argument. Idea generation represents the start of the innovation process and could be compared to the large opening of a funnel during which the focus will be on generating and mobilising a large number of ideas. The following stages of the innovation process represent the narrow part of the funnel and here the emphasis will be on the extent to which specific ideas can be transformed into innovative products and services. The final stage of the innovation process will represent the opposite and most narrow end of the funnel. This will represent the transformation of one or two ideas chosen during the idea generation process into innovative products, services and/or processes.

Each of the four phases included in the innovation process has their own unique challenges and therefore leaders have an essential role to fulfil in overcoming these challenges and helping to ensure that subordinates can successfully advance their ideas from initial conception to outputs that offer value for the organisation.

The following section will provide an in-depth overview on each of the four phases included the innovation process, the challenges associated with each of these phases and finally the leadership competencies considered necessary to move successfully through each of the phases will be outlined.

### 2.5.1 Idea generation phase and leadership knowledge, skills and attitudes

The idea generation phase represents the departure of the innovation process and is often referred to as the "birth of novel and new ideas" that will ultimately culminate into new and/or improved products, services or processes. Idea generation is inherently of a divergent nature with emphasis on the quantity of ideas produced and therefore leaders should make the costs of submitting ideas low enough that subordinates will not hesitate to submit them. Costs in this sense are not of a monetary sense, but rather refer to effort that needs to be exerted in the submission of an idea or the extent to which subordinates will be held accountable for the ideas they submit. The costs to submit ideas should however not be zero as a leader wants to keep its subordinates accountable for their ideas and think about their submissions before making them. As the innovation process progress through the various phases more and more emphasis will be placed on the quality of ideas and less on the quantity thereof.

If leaders intend establishing an innovative culture, it will be essential that they adopt an approach whereby new ideas are generated on a continuing basis within the realms of the team. Leaders need to establish a team environment in which subordinates feel comfortable generating ideas as they conduct work, as they interact with internal and external stakeholders, and even when they take a break. Creating an environment in which subordinates feel comfortable generating new ideas is the first and most important goal of leaders (Desouza, 2011). With regards to idea generation, teams may find themselves operating in either environments of "need" or environments of "playfulness".

*Environments of need* are focused on problems for which solutions must be found with the primary goal of finding quick fixes to problems by making use of incremental ideas. In these environments, ideas are predominantly of an incremental nature and can be implemented

quickly. These ideas are valuable and a large percentage of ideas generated within organisational contexts originate in environments of need – for the simple reason that the majority of employees spend a large percentage of their working life in these environments (Desouza, 2011).

*Environments of play* are more likely to engage employees in activities such as brainstorming and blue-sky thinking with the objective of coming up with radical, game-changing ideas. These environments are interesting spaces in which customers and business partners can potentially be included as their input can enrich the dialogue and add valuable new perspectives to a topic. In environments of need, the goal is the output, but in environments of play, the goal is the process (i.e. dialogue, discovery, and sharing of experiences). These events seldom generate ideas that can be pursued immediately as the goal is to generate as many ideas as possible, even if they initially seem “far-fetched and wild” (Desouza, 2011).

In the current business environment, characterised by constant change and uncertainty, speed has become a standard requirement of organisations worldwide. It is however in this rush to identify a problem or opportunity that many leaders tend to generate solutions before the true needs, desires, behaviours and experiences of stakeholders are fully understood. It should therefore be clear from the start that successful idea generation efforts will not be conducted prematurely or haphazardly, but rather with the objective in mind to attend to the unique needs of stakeholders and/or to exploit and capitalise on specific opportunities in the market.

It is essential that leaders will keep abreast of any new developments occurring in the external environment of the organisation which could potentially provide opportunities for the introduction of new and/or improved products, services or processes. Keeping abreast of new developments occurring in the external organisational environment, and more importantly inspiring subordinates to do the same, will require of leaders to constantly inspire curiosity on the part of their subordinates.

For innovation to flourish in any organisation, leaders need to encourage subordinates to constantly ask “why?” and “what if?” as they will have to think “outside of the box”, read widely and proactively explore solutions to problems. Leaders will inspire their subordinates to be curious by promoting and role-modelling an inquisitive mindset on a consistent basis. Leaders should additionally create opportunities for subordinates to gather necessary information in order to understand the needs of their customers and other stakeholders. For instance, in a global organization, the opportunity to work and interact with individuals from other international offices can develop the global acumen of the workforce and result in

employees being more inquisitive about the needs of important stakeholders they did not consider previously (Desouza, 2011).

This inquisitive mindset of leaders will typically be reflected by the fact that leaders should constantly be engaging in environmental scanning efforts in order to identify new opportunities in the market. For instance, by conducting a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis of an organisation's internal and external environment, the leader will be in a position to identify new opportunities existing in the industry which the organisation can potentially pursue.

It is critical that leaders will possess significant knowledge of the innovation process – this will include various related aspects of interest such as facilitating innovative behaviour in subordinates, the various phases in the innovation process as well as the characteristics and needs associated with innovative individuals. Being familiar with innovation and its related aspects will enable leaders to structure and manage idea generating initiatives in a way that will elicit optimal innovative performance on the part of their subordinates.

As is the case with most organisational endeavours, resource availability plays a significant role in the success or failure of innovative projects (Hunter & Cushenbery, 2011). Leaders have an essential facilitative role to fulfil during this phase by helping subordinates secure access to resources considered necessary for the development of creative ideas. These resources will not only include tangible resources such as creativity enhancing tools, but also intangible assets such as time availability to implement idea generation initiatives. In order to gain access to the necessary resources, leaders often have to persuade members of top management of the potential value that the idea generation activities could yield for the organisation. In addition, leaders are often required to negotiate with suppliers and obtain resources both timeously as well as at the most reasonable price(s) possible. It is therefore imperative that leaders will be able to engage successfully in persuasion and negotiation efforts with other organisational stakeholders.

Creative problems are inherently of an ill-defined and uncertain nature and therefore it is essential that leaders will communicate a vision to their subordinates to provide a sense of structure and direction to the team's innovative efforts. Although leaders have an active role to fulfil in formulating the team's innovation vision, it is imperative that leaders will also involve subordinates in the formulation process of the innovation vision to ensure their commitment and buy-in therein. Leaders need to communicate a clear vision of their team as innovative, unafraid of risk-taking, supportive of new ideas, and taking a proactive (rather than reactive) stance towards innovation in the marketplace. This vision of the team needs to be in line with organisational goals and will not merely be a statement regarding long-term

business objectives, but rather a statement of something in service to those objectives. In other words, “vision” here is a call to develop the conditions, processes and attitudes that will characterise a team as “innovative” (Le Storti, 2006).

In simple terms, a vision is less about what a team will produce or achieve and more about how it intends to operate. Similarly, Mumford et al. (2002) state that by framing the vision in terms of work goals and articulating this vision through project selection and project evaluation, rather than overt affective appeals, a work-focused vision, or mission, may be promulgated that will enhance the creative efforts of subordinates. A research study conducted by Zhang, Tsui, and Wang (2011) found that when leaders communicate a compelling vision of the future to their subordinates, subordinates will come to agree on a shared vision, priorities and desired outcomes. Leaders need to reinforce this innovation vision by continuously making subordinates aware of it and helping them understand how the vision intends addressing the gap between the current situation and the team’s innovation goals/objectives. Leaders should therefore not only possess the necessary knowledge to compile an innovative vision for their respective teams, but should also demonstrate effective communication skills in conveying this innovation vision to their subordinates.

It is essential that leaders will be actively engaged in idea generation activities from the start, partly because early involvement will reduce the sense of ambiguity associated with creative work and, in part, due to the fact that early involvement allows the leader to frame the ideas generated by subordinates in terms of the organisation’s needs. Empirical research results by Dionne and Juassi (2003) support a link between role-modelling and idea generation as they found that leaders who act creatively make themselves available for creative emulation, which in turn produces creativity in subordinates. Similarly, Perry-Smith and Shalley (2001) conducted a research study and results indicated that subordinates who were provided with a creative role model were able to learn what was considered creative from this model and, in turn, exhibited more creative behaviour. It should therefore be clear that leaders should be able to role model creative behaviours and be aware of the fact that their actions and/or lack thereof as leaders will have an impact on the creative efforts of their subordinates.

Technical expertise and creative problem-solving skills are considered essential if one is to lead creative individuals both because they provide a basis for structuring an inherently ill-defined task and because they provide the credibility needed to exercise influence (Mumford et al., 2002). Various research studies (Barnowe, 1975; Andrews & Farris, 1967; Mouly & Sankaran, 1999; Farris, 1969) indicate that technical expertise and creative problem-solving are critical determinants of effective leadership behaviour within innovative teams.

Given these findings, the issue at hand is not whether leaders need technical expertise and creative problem-solving skills but, rather, why a leader's technical expertise and creative problem-solving skills are considered such powerful influences on the innovative behaviour of subordinates? Broadly speaking, both social and cognitive phenomena seem to be involved in the process. More specifically, it has been found that the work focus, achievement motivation, and autonomy of creative individuals frame a situation where expertise is the most powerful form of influence at the disposal of a leader (Mumford et al., 2002). Given the strong professional identity of creative individuals, it may prove difficult for leaders lacking technical expertise and creative problem-solving skills to: (a) adequately represent subordinates, (b) communicate effectively with subordinates, (c) appraise the needs and concerns of subordinates, (d) develop and mentor junior staff and (e) assess the implications of subordinates' interactions with another (Mumford et al., 2002).

As idea generation activities get underway, it is essential that leaders should not only possess knowledge regarding the range of creativity enhancing tools to his/her disposal, but more importantly, that leaders will be competent in implementing these tools/activities to generate new ideas. Idea generating techniques which could potentially be utilised by leaders to facilitate the creation of creative ideas will include brainstorming activities, morphological analysis and lateral thinking to name but a few (McAdam & McClelland, 2002).

It is essential that the leader will act as a mentor and/or coach to subordinates during idea generation activities as the success of a leader's sense-making activities hedges on his/her coaching skills (Senge, 1990). Creative problems are inherently ill-defined and multiple solutions could be generated and developed by the implementation of iterative efforts. It should therefore be clear that creative work is of an uncertain nature (Mumford et al., 2002). This uncertainty demonstrates the important role of activities such as goal-setting and demonstration actions in reducing the amount of ambiguity and anxiety subordinates may experience during the creativity process. Therefore it is imperative that leaders will be able to successfully implement goal-setting and demonstration initiatives to provide a sense of structure to the idea generation activities of subordinates.

Leaders are responsible for structuring and facilitating idea generation in such a fashion that it will be intellectually stimulating for subordinates. Intellectual stimulation refers to the process whereby leaders increase employees' awareness of problems by stimulating subordinates to rethink old ways of doing things. Intellectual stimulation may create opportunities for subordinates to voice ideas that may have been overlooked and is, therefore, believed to trigger the idea generation process in particular (de Jong & Den

Hartog, 2007). It is important that leaders will constantly challenge current perspectives (i.e. the status quo), keep an open mind and resist the urge to reinforce the status quo by dismissing wide-ranging activities out of hand as subordinates will emulate these behaviours if it is role-modelled by their leaders.

Leaders that manage to stimulate innovation in their subordinates value a diversity of perspectives and will assist subordinates to span barriers, bridge geographic distances, and connect with other individuals who can challenge and fortify their thinking. A valuable method of assisting subordinates to expand their creative thinking skills and spark new ideas will involve the implementation of cross-disciplinary inquiry into the idea generation process. Cross-disciplinary inquiry seeks to connect subordinates with other individuals not only from different parts of the organisation, but also from other industries in a spirit of inquisitiveness and exploration. The establishment of these cross-disciplinary teams will often be dependent on the networking skills of the leader as he/she will need to draw on established business relationships with colleagues in different parts of the organisation and/or industry and get these individuals involved in the creative process (Desouza, 2011).

The recent recession has unquestionably led to the fact that organisations worldwide have become more risk-averse and conservative in the current global market. With regards to innovation this is a major concern as a fear of failure is considered one of the greatest hindrances of successful innovation efforts. When subordinates lack the necessary freedom to experiment and fear the consequences of making costly “mistakes and failures” they will shy away from the new and unknown, stick to the safe path and maintain the status quo of the team or organisation. These behaviours will not only impact negatively on the innovative efforts of teams, but also the organisation as a whole.

Research studies suggest that leaders of creative ventures can facilitate the idea-generation process by providing the necessary autonomy and freedom to subordinates to let creative ideas flow (Mumford et al., 2002). A study conducted by Barnowe (1975) found that overly close supervision and, thus, presumably highly detailed work plans, will tend to inhibit the performance of creative people. Similarly, a study conducted by Arad et al., (1997) revealed that the degree to which employees have freedom and authority to participate in decision-making processes when solving problems will determine their level of empowerment, which is positively related to the level of creativity and innovation in teams. Leaders should therefore focus on empowering subordinates instead of trying to control them as creative people evidence a strong orientation towards autonomy, not only seeking out jobs where autonomy is provided, but also performing better under conditions where they are at least granted a moderate degree of autonomy (Oldham & Cummings, 1996).

It is important to take note of the fact that creating freedom also implies that subordinates will experience a certain sense of freedom from the fear of failure associated with creative efforts. Most organisations rarely, if ever, view failure as a viable or even acceptable outcome – especially so the current competitive business environment. Leaders need to tolerate the mistakes made by subordinates and in cases where subordinates do in fact make mistakes it is important that leaders will consult with subordinates and have open discussions regarding the mistake(s) made.

During these one-on-one consultations with subordinates, leaders need to emphasise the fact that mistakes are not viewed as failures – but instead invaluable learning experiences and investments the team or organisation are willing to incur for subordinate(s). This type of attitude on the part of leaders will help establish an innovative team culture in which subordinates will be encouraged to generate new ideas, without fear of criticism, and where emphasis is on what is supported instead of on what is not considered viable.

Leaders need to be sensitive to which methods of reward and recognition will inspire their subordinates to be more creative and innovative in the workplace. Additionally, leaders need to have knowledge of the process whereby subordinates are motivated to engage in innovative efforts as intrinsic rewards (e.g. increased autonomy) will motivate some subordinates more than others to engage in innovative efforts than extrinsic rewards (e.g. increased levels of remuneration) would. A research study conducted by Jung (2001) found that organisations providing intrinsic and extrinsic rewards for subordinate efforts to acquire new skills and experiment with creative work approaches constantly reinforced the desire of these subordinates to engage in creative endeavours.

Additionally, researchers such as Collins and Amabile (1999) indicate that extrinsic rewards can actually diminish the creativity of individuals due to its impact on intrinsic motivation. Leaders need to reward subordinates appropriately for assuming risks, experimenting and generating new ideas during creative efforts by engaging in a fine balancing act and ensuring the intrinsic and extrinsic rewards subordinates receive are in an optimal ratio. The significant role of intrinsic and extrinsic motivation in the remuneration process would imply that leaders should have knowledge of the complex motivational processes whereby subordinates will decide whether or not to engage innovative efforts, such as idea generation.

Leaders of creative efforts need social perceptiveness, flexibility, wisdom, and social appraisal skills – attributes commonly subsumed under the rubric of social intelligence (Zaccaro, Gilbert, Thor & Mumford, 1991). A leaders' social intelligence and/or social skills will influence the creative efforts of subordinates in several ways. First, leaders must know

when, who, and how to persuade – all requirements that place a premium on social perceptiveness and wisdom. Second, as noted earlier, creative work is person-centred where people are working under stressful conditions. Thus, social perceptiveness and wisdom may be needed for the effective management of subordinates. Third, leaders must be able to manage interactions among diverse individuals with strong egos. Thus, leaders will not only need to be perceptive, but must also be flexible. Fourth, perceptiveness and flexibility will also be required because leaders must know when and how to provide feedback (Mumford et al., 2002). It can therefore be argued that leaders need to possess the ability to motivate subordinates throughout the idea generation face and be persistent in their efforts – specifically when faced with challenges and adversity.

From this section it should be evident to the reader that the generation of new ideas will take place either by way of formal idea generation techniques and/or informal idea generation techniques.

Formal idea generation techniques such as brainstorming sessions and lateral thinking sessions are mainly aimed at generating ideas of a radical nature. On the other hand, informal idea generation techniques such as idea suggestion boxes and organisation Intranet websites are mainly utilised to generate ideas of an incremental nature. Organisations and teams can implement both formal and informal idea generation techniques, but the type of innovation (i.e. radical versus incremental) outputs required will ultimately dictate which idea generation technique will be implemented in a specific organisation or team. Regardless of the idea generation technique implemented, leaders have an essential role to fulfil during the idea generation phase – most notably in the form of a facilitative role for subordinates.

Whereas the idea generation phase emphasised the importance of generating a large number of new ideas, the following phase of idea screening will function as a sifting process and evaluate the merit of each idea at the hand of certain criteria.

Table 2.2 below will provide a summary of the leadership competencies (i.e. knowledge, skills and attitudes) required for successful completion of the idea generation phase.

*Table 2.2*

*Leadership Knowledge, Skills and Attitudes required during the Idea Generation phase*

| | |
|---|---|
| **Knowledge** | Have knowledge of any new developments occurring in the external environment of the organisation; possess a broad knowledge of innovation and related aspects thereof; have knowledge of the principles involved in effective persuasion and negotiation efforts; possess knowledge of how to compile an innovation vision/mission; be aware of the fact that role-modelling behaviours will influence the innovative efforts of subordinates; need to possess relevant technical expertise and creative problem-solving skills; have knowledge of the various idea generating techniques; possess knowledge of the principles involved in effective goal-setting and demonstration actions; knowledge of structuring idea generating activities so that it is intellectually stimulating; possess knowledge regarding the implementation of cross-disciplinary teams; be aware of the fact that overly close supervision and highly detailed workplans can inhibit the creativity of subordinates; possess knowledge of the motivational processes whereby subordinates choose to engage in innovative efforts; have knowledge of the process whereby reward systems stimulate creative behaviour; possess social intelligence; have knowledge of the principles and guidelines involved in acting as a mentor/coach to subordinates |

Table 2.2 (continued)

| | |
|---|---|
| **Skills** | Role-model an inquisitive mindset to subordinates; engage in environmental scanning efforts; engage successfully in facilitation, persuasion and negotiation efforts; demonstrate effective communication skills in conveying vision; displaying innovation role-modelling behaviours to subordinates; be competent in implementing various idea generating techniques; demonstrate effective goal-setting and demonstration actions to subordinates; structure idea generating activities in a fashion that is intellectually stimulating for subordinates; demonstrate the necessary networking skills in order to establish cross-disciplinary teams; will be competent in implementing reward systems to stimulate creative behaviour in subordinates; display social skills; possess the necessary mentor/coaching skills; possess the ability to motivate subordinates |
| **Attitudes** | Constantly inspire subordinates to be curious and challenge the status quo; value diverse perspectives; focus on providing freedom and autonomy to subordinates (empowerment); be tolerant of mistakes made by subordinates; view mistakes as invaluable learning experiences; be persistent in achieving innovation goals and/or objectives |

### 2.5.2 Idea screening phase and leadership knowledge, skills and attitudes

Most organisations make the costly error of collecting ideas without having any systems and/or structures in place to determine what to do with these ideas. This is costly, not only because of lost opportunities to advance the organisation, but also due to the opportunity costs involved – the time and effort spent on collecting ideas that could have been used for other purposes (Desouza, 2011).

The idea screening process essentially consists out of two distinct processes in the form of the advocacy process and the screening process. The first process, advocacy, involves that some individuals – often leaders – will champion (support and advocate) specific ideas produced during the idea generation process. The second process, screening, involves that

the championed ideas will be evaluated at the hand of certain criteria to determine how well these ideas will meet the current and future needs of the organisation or team.

The most critical contributor to successful innovation, according to the literature, is the judgement and ability of those championing innovative projects (Kelley & Lee, 2010). Similarly, Shane (1994) conducted a research study and found that idea champions were broadly important to innovation effectiveness across the 43 organisations he studied in 68 different countries. These individuals championing innovative ideas within the realms of the organisation are more commonly referred to as idea advocates. Essentially, the role of idea advocates entails securing the necessary resources to implement innovative ideas by communicating the value of these ideas across the hierarchical layers and vertical silos of the organisation (Desouza, 2011).

A research study conducted by Kelley and Lee (2010) indicate that in some cases idea advocates are not found in senior levels of organisations. It should hence be clear that although many leaders take up the responsibility of the idea advocate role, it can also be fulfilled by other team members which do not function in traditional leadership positions. This would imply that leaders, in cases where they themselves are not functioning as idea advocates, have a facilitative role to fulfil in enabling other team members to be successful idea advocates.

Desouza (2011) mentions that idea advocates for incremental ideas are best chosen from functional divisions of an organisation. These individuals should have achieved a level of expertise that earns them the respect and trust of their peers, and should ideally have the time and resources to encourage idea generation, meet with idea creators, push problems of interest, and continuously draw attention to areas that need new ideas. In contrast, idea advocates for radical ideas must have a broad expertise across departments and should ideally have a good understanding of the strategy of the organisation, its current and future environments, its external networks, as well as the research and development efforts within the organisation. It is important that idea advocates of radical ideas will function in senior roles, possess the authority to act on radical ideas and should be given a mandate to take on projects with higher risk profiles (Desouza, 2011).

It is essential that idea advocates will have satisfactory communication skills as it is often considered the cornerstone of successful idea generation efforts. This would be reflected by the fact that idea advocates communicate with idea creators on a constant basis, idea advocates communicate with one another to share ideas as well as best practices and idea advocates communicate the potential value of new ideas throughout their team and organisation via championing.

Idea advocates also need to ensure that the advocating process is of a transparent nature and communicate this to other team members, as transparency will result in team members having confidence in the advocacy progress. Team members should be informed where to submit an idea, how long it will take for an idea advocate to review it, and when the proposed idea will receive feedback (Desouza, 2011). Idea advocates should regularly exchange advocacy strategies and cross-pollinate ideas with other idea advocates from different teams and departments in their organisation. This collaboration with idea advocates from other teams and organisation departments would imply that idea advocates will need to possess a certain degree of networking skills.

Moreover, as a matter of routine, idea advocates should take inventory of all incoming ideas to try and identify trends and patterns (Desouza, 2011). For example, if a large percentage of the ideas submitted within the team happen to relate to a certain client or business line then the idea advocate should instruct team members to attend carefully to this space.

Idea advocates should have the opportunity to regularly meet with leaders in other teams and the rest of the organisation to inform management of the type of ideas submitted. Meetings between idea advocates and leaders will additionally provide an opportunity for management to notify idea advocates of the current challenges present in various departments as well as the organisation's plans and strategies for future growth. It is therefore essential that idea advocates will have good communication skills and attain optimal results from these meetings.

In cases where the leader him/herself is not functioning in the idea advocate role, leaders should fulfil a facilitative function with regard to idea advocacy. For instance, leaders should leave some room for serendipity in idea advocacy and Desouza (2011) mentions that although leaders should identify formal idea advocates in their team and organisation, the workforce as a whole should be encouraged to advocate ideas. Leaders should furthermore be involved in the design and formulation of forums and platforms where employees can showcase their ideas and interact with relevant parties. Designing, formulating and instilling these idea advocacy forums and platforms in the structure of the organisation will invariably require some type of resource input. It can hence be argued that leaders will need to possess adequate persuasion and negotiation skills to obtain the necessary resources and approval for implementing these forums and platforms.

Finally, leaders will need to recognise and reward the efforts of idea advocates if they intend cultivating a strong culture of idea advocacy in their specific team. All ideas are not equal, and therefore idea advocates who advocated for radical ideas should be rewarded more so than those individuals who advocated for incremental ideas – though not in a manner that

makes it harder to move incremental ideas ahead. It is important to take cognisance of the fact that leaders should recognise and reward the efforts of idea advocates – even during instances where they failed to implement any ideas of significance.

Idea advocacy is followed by the practice of idea screening and during this procedure idea screeners sift through the ideas presented by idea advocates with the objective of determining which ideas can be transformed into innovative products, services and/or processes. In short, whereas the idea generation phase emphasised the quantity of creative ideas produced, the focus of the idea screening phase is solely on the quality of these creative ideas.

Although the role of idea screeners will not always be the responsibility of leaders, it is evident from research literature that the characteristics of individuals functioning in leadership positions will make leaders more suitable to fulfil the function of idea screeners successfully. Mumford, Marks, Connelly, Zaccaro and Reiter-Palmon (2000) indicate that leaders need to evaluate the creative ideas of subordinates produced during the idea generation phase. Given the ill-defined nature of creative work and the novelty evident in all creative problem solutions, it may be difficult, if not impossible, to evaluate ideas, and provide feedback to subordinates or, for that matter, other managers when leaders lack expertise and creative problem-solving skills (Mumford et al., 2002). A similar study conducted by Basadur, Runco and Vega (2000) indicated that individuals will need to possess creative problem-solving skills to effectively evaluate creative ideas.

Successfully screening ideas will require of leaders to have an in-depth understanding of the product, process, or technology evaluated as well as an in-depth understanding of the organisation, its capabilities and its markets. Accordingly, it can be argued that idea screeners will need to possess over sufficient levels of organisational – and technical expertise to screen ideas successfully.

One of the most important roles idea screeners need to fulfil to help drive innovation in their organisation is to decrease the likelihood of risk by way of identifying ideas with “acceptable risk”, in other words, projects or challenges where failure will have less of a negative impact on the team or organisation. Cardinal (2000) suggest that the planning efforts of idea screeners should focus on the general types of ideas that should be pursued, as well as the consequences of pursuing these ideas into the development phases of the innovation process. This observation would imply that environmental scanning efforts and forecasting activities, two essential components of planning, will have a critical role to fulfil during the idea screening phase.

Idea screeners need to be critical during the screening process whilst providing an honest and constructive assessment of the ideas generated by co-workers and subordinates (Le Storti, 2006). This being said, Galluchi, Middleton and Kline (2000) conducted a research study and found that innovative individuals will withdraw from creative efforts if they are confronted with premature criticism. In this regard, it is essential that idea screeners should not criticise the creative efforts and ideas of other parties during the formative phase (i.e. idea generation phase) as premature criticism will undoubtedly hinder the participation and performance of individuals involved in the innovation process.

Idea screeners need to communicate actively with other parties involved in the idea screening process and inform them that they will need to have realistic expectations of the idea screening process. In other words, those parties involved need to realise that for every idea that survives the screening process, there might be a hundred that was passed over. Additionally, those parties involved in the idea screening process should be informed of the existing pressures on the team and organisation (e.g. resource and financial constraints) and educated on how they will be able to refine and adjust their ideas by way of feedback obtained during the idea screening process. Barlow (2000) conducted a research study and found that idea screening not only serves to select the appropriate ideas, but additionally acts as a spur to the progressive refinement of potentially useful ideas. Based on these findings, it can be argued that idea screeners need to draw on their technical expertise, as well as creative problem-solving skills and provide the necessary advice and support to co-workers regarding how they can adjust and/or refine their creative ideas to meet the needs of the organisation more sufficiently (Desouza, 2011).

The advice and support idea screeners provide to co-workers and subordinates should invariably be in the form of continuous feedback sessions between the relevant parties throughout the idea screening process. When co-workers and subordinates invest their time and energy in documenting and submitting ideas for evaluation, they expect their efforts to be acknowledged. During feedback sessions, idea screeners need to communicate with idea submitters in a constructive and tactful fashion – specifically offering advice and suggestions on how some of their ideas can be refined and/or improved. It is important that idea screeners will remain objective throughout idea screening process and regulate his/her own emotions successfully. Idea screeners will also need to be able to accurately identify and respond to the emotions displayed by idea submitters – specifically instances where critical feedback is provided to idea submitters that were unsuccessful in the idea screening process. This would imply that besides good communication skills, idea screeners would need to possess high levels of social intelligence – specifically in the form of emotional intelligence.

It is important to be aware of the fact that a standardised or universal approach to idea screening does not exist and the manner in which idea screening will be implemented will depend on several factors. For instance, large organisations with considerable amounts of financial resources to their disposal will be more likely to implement sophisticated idea screening initiatives in comparison to smaller organisations with financial and budgetary constraints. The type of innovation at hand (incremental versus radical) and confidentiality thereof will also determine whether external parties will be involved in the idea screening of specific ideas.

The value of external parties are often overlooked, however, the reality is that organisations can benefit considerably from including outsiders in the idea screening process. This is especially true when the idea(s) under consideration will directly affect the customers and/or current or future product offerings. As mentioned earlier, however, the inclusion of external parties in the idea screening process will depend on the type of innovative idea at hand. For instance, incremental ideas are often related to minor improvements in products, services and/or processes and here one could easily make use of external parties during idea screening. Radical ideas, on the other hand, which is often related to significant improvements in products, services and/or processes are often referred to as “groundbreaking” and these type of ideas are often highly proprietary, sensitive in nature as well as vulnerable to leaks and should not be made public to external parties. Similarly, Desouza (2011) states that engaging a large number of external parties (i.e. leveraging the wisdom of crowds) will not be helpful when the idea being discussed requires significant expertise and/or is highly technical in nature.

When evaluating incremental ideas, it will certainly be useful for idea screeners to implement democratic mechanisms to support the evaluation of ideas (e.g. by leveraging the wisdom of crowds) to engage external stakeholders in the idea screening process and gain their input with regards to ideas that will advance to the feasibility phase of the innovation process (Desouza, 2011). It is critical that idea screeners will be open-minded and receptive to the suggestions and opinions of external stakeholders during the idea screening process.

Desouza (2011) mentions that ideas are best screened as areas of investments or thoughts to bet on, not as artefacts that can be planned to the last detail with all contingencies and risks accounted for. Leveraging the wisdom of crowds essentially implies that employees are engaged in the idea evaluation process and a popular example of this idea evaluation mechanism is that of “prediction markets”. Prediction markets are considered useful in situations where organisations need to sift through a large amount of submitted ideas and entail that employees vote for the idea(s) they perceive to have the most business potential.

After a period of thirty days, an idea review team which consists out of leaders, then collectively determines which of the top-valued ideas will be pursued by the organisation (Desouza, 2011).

Another common practice among product-development organisations is to create a “shortlist” of possible ideas to pursue and then customers are engaged in the final phase of the idea screening process. Customers are brought into the idea screening process not only to vote on ideas or identify which ideas they would be willing to co-fund, but also to engage in rich conversation about how the ideas can be refined, developed, and deployed more effectively (Desouza, 2011). It is therefore important that leaders will be aware of the value external parties could lend to the idea screening process.

It is critical that the organisation will avoid politicising the idea screening process. As human beings we are inherently influenced by biases and allegiances to specific groups, teams, friends as well as other co-workers. This has proved to be a challenge for the idea screening process as for disgruntled employees whose idea(s) were not selected during idea screening, politics often becomes the main scapegoat. The potential for discontent intensifies when the idea screening process lacks the necessary transparency, as this will result in rumours and gossip about how certain ideas were selected during idea screening. Similarly, employee support for the idea screening process will be weak if the process is viewed to be politically motivated and based on special interests and/or behind-the-scenes dealings. Idea screeners can neutralise these perceptions by adopting a democratic approach to idea screening and ensuring that the entire screening process is conducted in an open and transparent manner.

As mentioned earlier in this section, the type of idea screening process implemented in an organisation will ultimately depend on the type of idea at hand, as well as characteristics of the organisation implementing the idea screening process. Those leaders who do implement democratic and participatory idea screening processes should always remain cognisant of the fact that external parties only make recommendations on which ideas should be funded by the organisation and will not be responsible for making the final decision in this regard. The authority with regards to which ideas should be funded and the amounts of funds allocated will ultimately reside with those individuals fulfilling the function of idea screeners.

Table 2.3 below will provide a summary of the leadership competencies (i.e. knowledge, skills and attitudes) required for successful completion of the idea screening phase.

Table 2.3

*Leadership Knowledge, Skills and Attitudes required during the Idea Screening phase*

| | |
|---|---|
| **Knowledge** | Be aware of the fact that the idea advocacy process should be transparent; have knowledge of the fact that a large percentage of ideas submitted indicates an area that should be attended to; be aware of the fact that as an idea advocate one has to meet with leaders in the organisation on a regular basis; have knowledge of the fact that serendipity should form part of idea advocacy in the organisation; have knowledge of the principles involved in designing and formulating idea advocacy forums and platforms; be aware of the principles involved in effective negotiation efforts; have knowledge of the process whereby idea advocates are rewarded for their efforts; possess sufficient amounts of technical expertise on the subject matter screened; possess sufficient knowledge regarding the organisation, its capabilities and markets; have knowledge of planning activities and procedures (i.e. environmental scanning and forecasting); be aware of the fact that premature criticism will hinder innovative performance efforts of subordinates; be aware of the fact that subordinates expect acknowledgement for their efforts with regards to idea generation; possess adequate levels of social intelligence (i.e. emotional intelligence); have knowledge of the various types of mechanisms which can be utilised to evaluate ideas; be aware of the potential value and insight external stakeholders can offer to the idea screening process; have knowledge of the principles and underlying elements involved in a democratic idea screening process |

Table 2.3 (continued)

| | |
|---|---|
| **Skills** | Possess the ability to implement a transparent idea advocacy process; demonstrate networking skills to collaborate with idea advocates from other business units; possess the ability to take inventory of all incoming ideas and identify trends and patterns; demonstrate the ability to engage in effective persuasion and negotiation efforts; demonstrate and engage in effective creative problem-solving skills; possess the ability to successfully engage in environmental scanning and forecasting activities; provide appropriate and timely feedback to subordinates regarding their ideas; possess the ability to communicate effectively with idea creators, other idea advocates and co-workers; possess the ability to regulate his/her own emotions as well as identifying the emotions of subordinates; demonstrate the necessary skills to successfully implement democratic idea evaluation mechanisms |
| **Attitudes** | Allow for a sense of serendipity in the idea advocacy process; reward idea advocates for their efforts – even if they fail to implement any ideas of significance; have a realistic view of the idea screening process; feedback should be provided in a constructive fashion (i.e. positive frame of reference); remain objective when evaluating ideas; should be open-minded and receptive to the suggestions and opinions of external stakeholders involved in the idea screening process; emphasise openness and transparency in the idea advocacy and idea screening process; assume responsibility for ideas which will advance to feasibility phase |

### 2.5.3 Feasibility phase and leadership knowledge, skills and attitudes

During the feasibility phase, scientific methods are applied by leaders and subordinates to generate knowledge that will allow the team to test out, refine, and evaluate the potential of ideas by observing the interplay between causes and effects under various environmental

conditions. The aim of experimentation activities is to test the feasibility and elasticity of ideas that have successfully made it through the idea generation and idea screening phases.

Leaders often fulfil the main role in the experimentation process, but the responsibilities of this function will not be exclusively reserved for those individuals in leadership positions. Subordinates could also fulfil the main role in the experimentation process and in this case it will be the responsibility of the leader to fulfil a facilitative role and assist subordinates in overcoming the various challenges he/she encounters throughout the experimentation process.

In order to determine the feasibility of an idea, leaders or those in charge of the experimentation process will need to consider the costs, benefits, effort, resources, and risks involved in transforming an innovative idea into a viable product, service and/or process. With regard to the elasticity of an idea, emphasis will be on the potential reach of the product, service and/or process (either internal or external) that will result from the implementation of the idea and this will include the number of domains in which the product, service and/or process can be deployed successfully (Desouza, 2011).

McAdam and McClelland (2002) conducted a study and found that leaders need to determine both the commercial and technical feasibility of ideas during the feasibility phase. In order to test out a wide range of ideas in the most effective manner possible, leaders need to attend to two central issues with regard to experimentation. Firstly, leaders should democratise the experimentation process – in other words, experimentation should become essential to the manner in which work is conducted across various levels of the organisation instead of confining it to the research and development department. Secondly, leaders need to fulfil an active role in establishing an organisational and team culture in which experimentation is regarded an essential prerequisite for decision-making processes with regards to innovation.

Experimentation is considered time as well as resource intensive and to this end it is of utmost importance that resources dedicated to the experimentation process will be implemented and utilised in a cost-effective manner. Leaders will be able to facilitate the cost-effective use of resources by developing a standardised process that can be followed by everyone in their organisation or team - a template for experimentation, so to speak - that will provide a mechanism for systematically training subordinates to experiment with ideas and share their results with confidence and in a manner that will lend them credibility (Desouza, 2011).

Standardisation of the experimentation process in the form of a template will promote the consistent use of good practices, guard against the duplication of efforts and provide a baseline for subordinates to compare and evaluate results obtained during the experimentation process (Desouza, 2011). It is critical that leaders will enable subordinates to modify the experimentation template to meet their specific needs during the experimentation process as this will assist subordinates in avoiding common mistakes and communicating their findings more clearly.

It is important that leaders will be able to compile a user-friendly experimentation process template to guide the actions of subordinates during the feasibility phase. To compile such an experimentation template, leaders will need to have sufficient knowledge of the scientific inquiry process and will be able to engage in successful scientific research initiatives themselves. It is important to take note of the fact that the implementation of an experimentation process template will not be a standard practice for each and every organisation. For example, a small organisation with relatively few employees which choose to conduct experimentation on an informal basis might not benefit from the implementation of an experimentation process template as it will more than likely not justify the costs thereof and ultimately become redundant. In contrast, for a large technology-oriented organisation with many employees, the implementation of an experimentation process template might provide a sense of direction and structure for the experimentation efforts of employees (Desouza, 2011).

During the course of the feasibility phase leaders will have to persuade members of top management to provide the necessary time and resources required for conducting successful experimentation practices. Leaders will often serve as a mentor or coach during the feasibility phase and provide subordinates with much needed advice and support during the experimentation process. Leaders will need to train subordinates on the various elements of the scientific inquiry process – this will range from basic terms and definitions to specific guidelines and procedures that need to be followed during scientific inquiry.

Leaders in charge of the experimentation process should establish an organisational culture where experimentation is valued and instilled into the work practices of the team as this will ultimately promote the development of ideas and solutions based on hard (factual) data (Desouza, 2011). During the feasibility phase leaders should not only encourage subordinates to experiment with ideas, but rather make it clear to subordinates that experimentation is considered a prerequisite if subordinates intend developing and/or proposing new ideas.

To ensure that the experimentation process is conducted successfully, leaders should begin experimentation with the premise that most ideas fail during this process and the burden of proof for an idea's viability rests on evidence and data (Desouza, 2011). This type of attitude will emphasise the fact that the experimentation process itself serves as an invaluable learning experience for those involved therein – regardless of whether the results indicate success or failure for the idea(s) being tested.

To maximise the amount of learning gained from the experimentation process, it is essential that team members in charge of the experimentation process will document and record findings from the experimentation process. Leaders will often fulfil this record-keeping role and document findings such as the lessons learned during the experimentation process on the individual, team and organisation levels. It should be noted that if leaders evaluate experiments solely in terms of their costs and potential returns, they will treat every idea that fails to yield the expected results as a failure to be abandoned (Desouza, 2011). Leaders need to inform subordinates that experiments that yield unexpected results have immense value as it offers ample room for reflecting, learning and generating new knowledge.

During the experimentation process leaders, as well as other team members at the helm of experimentation efforts, need to serve as role models and constantly challenge the status quo - a fundamental characteristic associated with a learning organisational culture. Leaders also need to monitor and pay close attention to the experimentation process and make use of information gathered during the process (i.e. positive and negative feedback) to refine the experimentation procedure on a continuous basis in order to achieve optimal results.

As mentioned earlier, the goal of the experimentation process is to develop new knowledge and test the ideas presented by idea advocates in new settings. It should therefore be clear that leaders have an influential role to fulfil in establishing an innovation culture whereby experimentation is extended beyond merely the research and development labs. In this type of work environment, subordinates will be encouraged to try out new ideas, build prototypes, and gather data rather than simply going with their "gut" feelings (Desouza, 2011).

Table 2.4 below will provide a summary of the leadership competencies (i.e. knowledge, skills and attitudes) required for successful completion of the idea screening phase.

Table 2.4

*Leadership Knowledge, Skills and Attitudes required during the Feasibility phase*

| | |
|---|---|
| **Knowledge** | Have knowledge of the principles and guidelines involved in developing a experimentation process template; possess sufficient knowledge of the scientific inquiry process; be aware of the fact that lessons learned from the experimentation process should be documented and recorded adequately; have knowledge of the fact that unexpected results is a valuable source of knowledge; should be aware of the behaviours that characterise a learning organisational culture; be aware of the fact that the experimentation process needs to be constantly refined and adjusted to achieve optimal performance |
| **Skills** | Demonstrate the ability to compile an experimentation process template; capable of engaging in successful scientific inquiry research efforts; demonstrate the ability to act as a mentor and/or coach for subordinates during the experimentation process; proficient in educating and training subordinates on a variety of elements related to the experimentation process; will be competent in role-modelling behaviours that facilitate a learning organisational culture; demonstrate the ability to refine and adjust the experimentation process |
| **Attitudes** | Value the use of experimentation and the development of ideas/solutions based on factual data; emphasise experimentation as a prerequisite if subordinates intend developing and proposing ideas; be realistic and be aware that most ideas fail during the experimentation process; emphasise that the burden of proof for an idea's feasibility is contingent upon evidence and data; consider the experimentation process as an invaluable learning experience – regardless of the outcomes; views unexpected results as invaluable opportunities to reflect and learn; possess an inquisitive mindset that constantly challenges the status quo |

### 2.5.4 Commercialisation phase and leadership knowledge, skills and attitudes

Commercialisation is at the intersection of innovation and entrepreneurship and involves all the processes and activities that bridge the gap between economic value creation and economic value realisation (Prebble, de Waal & de Groot, 2008). In simple terms, commercialisation refers to the processes and/or activities whereby ideas are transformed into innovative business solutions in the form of products, services and/or processes.

Unlike the previous phases in the innovation process, where the organisation took a backseat to its employees, the organisation takes control during this phase. Most idea creators lack the necessary expertise or even interest in the administrative, marketing, legal, and accounting aspects related to commercialisation and therefore it is rare for idea creators to drive the commercialisation process in an individual capacity (Desouza, 2011).

Due to the wide array of aspects involved in the commercialisation process, commercialisation efforts are often implemented by teams within the organisation. It should be noted, the type of idea (i.e. incremental versus radical) being commercialised will dictate the specific type of team that will drive the commercialisation process. For instance, the commercialisation process of an incremental idea in a small organisation will most probably be driven by a project/work team. Desouza (2011) mention this project/work team will consist out of a small number of employees with the necessary knowledge and abilities required to "bring this idea to life". For the commercialisation of a radical idea in a large technology-driven organisation, cross-functional teams will be established to head up the commercialisation process. These cross-functional teams will consist out of individuals from various departments of the organisation and each will possess considerable expertise on subject matter considered necessary for successful commercialisation efforts (Desouza, 2011). These cross-functional teams will often have many resources at their disposal and will invariably possess a large degree of freedom in the manner they wish to conduct their work.

It should hence be clear, during the commercialisation phase leaders can find themselves in either one of two roles. Firstly, leaders can function in a facilitative capacity whereby they provide a sense of structure and direction to the work/project/cross-functional teams implementing the commercialisation process. Secondly, leaders can find themselves in a position where they are actually members of the teams responsible for executing the commercialisation initiatives of an organisation.

The following section will primarily focus on the role leaders fulfil whereby they provide a sense of structure and direction to the commercialisation efforts of work/project/cross-functional teams.

When leaders function in a facilitative capacity it will be important to consider the price – either in Rands or opportunity costs – a customer or client will be willing to incur for the products, services or processes offered by the organisation. Another important consideration leaders will need to take into account will entail the most appropriate target group to which the product, service or process can be pitched to initially.

Depending on the type of idea at hand, leaders will be responsible for selecting the members of the work/project/cross-functional teams in charge of the commercialisation process. During selection leaders should choose individuals who have experience in bringing products to market and typically cross-functional teams will include representatives from marketing, public relations, engineering (if applicable), legal, and many other units in which the idea need to be launched (Desouza, 2011). It will ultimately be the responsibility of the commercialisation team to take an idea from a concept to an innovative product, service or process adopted by customer and/or clients. Therefore it is important that leaders will need to understand the various phases in the commercialisation process, be able to delineate the characteristics of competent commercialisation teams and will be in a position to successfully assemble commercialisation teams.

One of the most important roles fulfilled by leaders during the commercialisation phase involves the development of a commercialisation strategy that will provide a sense of structure and direction to the commercialisation efforts of teams. During the formulation of the commercialisation strategy leaders need to identify the resources and assets that will be required to move the idea to the market. If essential resources cannot be secured internally, leaders will have to meet with the commercialisation team and evaluate whether to acquire these resources from the outside, hold off on the commercialisation process, or abandon commercialisation of that specific idea altogether (Desouza, 2011). It should hence be clear that the ability to obtain specific resources – whether it is internal or external to the organisation – will depend to a large extent on the networking and/or negotiation skills of leaders.

If the necessary assets are available internally, leaders will need to calculate the opportunity cost involved in diverting the resources from their current function to support the commercialisation of the idea. Desouza (2011) mentions that if assets need to be acquired, leaders need to identify the “life cycle” of the innovation, and determine how much of the cost of the asset can be written off over the life cycle of the innovation. This would imply that

leaders should be competent in calculating metrics such as expected return on investment (ROI), internal rate of return and payback period (how fast the organisation can recoup its investment) in order to determine whether investments in specific resources will be justified.

Leaders need to provide idea creators with an opportunity to voice how they would prefer to be involved in the commercialisation process (Desouza, 2011). Valuing the involvement and input of idea creators throughout the commercialisation process will invariably require of leaders to be open-minded and receptive to the views and/or opinions of idea creators. Idea creators will typically provide input throughout the innovation process and watch the commercialisation process unfold. The commercialisation team will assume the primary responsibility for implementing the commercialisation strategy and therefore leaders should be willing to give up a certain amount of control and delegate specific tasks and/or responsibilities which can be fulfilled more adequately by members of the commercialisation team.

Additionally, leaders should provide members of the commercialisation team with sufficient time to implement their ideas. It is critical that leaders are aware of the fact that team leaders may require training with regard to the type of work that will be conducted in order to commercialise ideas. Another function of leaders in this facilitative capacity is to ensure that members of commercialisation teams have access to leaders with the relevant skill sets and knowledge. Ensuring that team members have access to experts in the organisation will require a certain degree of networking skills on the part of leaders, as well as an overall awareness of which organisation members are considered experts in specific fields of interest (Desouza, 2011).

The commercialisation strategy compiled by leaders will need to stipulate the characteristics and size of the intended target market. This would mean that in order to explore the potential zone of influence of the organisation's product, service or process leaders will have to engage in market research efforts of some sort. Desouza (2011) state that these market research efforts of leaders will be focused on the identification of immediate target markets which can be tapped into at present, as well as potential future markets for long-term prospects. In this regard it can be argued that leaders will need to possess, at the very least, some knowledge of marketing and will be able to engage in market research initiatives.

The commercialisation strategy leaders develop should identify the idea's path to market by including product launch plans as well as other plans for moving from initial market entry to market saturation or full exploration (Desouza, 2011). Leaders will need to remain cognisant of the fact that the commercialisation strategy should be revised and adjusted routinely to

ensure that commercialisation efforts comply with the dynamic nature of the external environment.

When formulating the commercialisation strategy, leaders need to calculate a reasonable and accurate amount of time considered necessary for bringing an idea to market (Desouza, 2011). An example of this would be to launch an idea at a time when there are not many other competitors competing for the attention of your potential customers or clients. The reality is that many commercialisation efforts often fail as result of poor timing with regard to market entry and not necessarily due to the product, service or processes introduced into the market. Leaders should conduct environmental scanning efforts, observe and interpret market tendencies, as well as the actions of competitors, to ensure that the entry of ideas into the market is timed in a manner that will result in optimal diffusion by the market (Desouza, 2011). This would imply that leaders need to be patient with the introduction of new products, service or processes into the market and avoid rushing or haphazardly introducing new ideas into the market.

A commercialisation strategy, like any marketing strategy, needs to be based on the "three P's" of *packaging*, *pricing* and *promotion* (Desouza, 2011). As mentioned earlier, the marketing functions will in most cases be fulfilled by individuals functioning in the commercialisation team, specifically so in situations where leaders lack the necessary marketing knowledge and experience. It has to be emphasised that although team members ultimately fulfil the marketing functions in the majority of cases, leaders will have an active role to fulfil in the manner in which marketing functions are performed by the commercialisation team.

In terms of *packaging*, one of the most influential decisions leaders need to make is to decide whether to create new packaging that will clearly differentiate the idea or "piggy-back" the idea onto an existing solution. Each of the alternatives has their own unique advantages and leaders therefore need to decide which type of packaging is most suited to the product, service or process of the organisation. For instance, clearly differentiating a product, service or process by way of packaging might raise awareness of thereof, while presenting the product, service or process in collaboration with other ideas may increase the utility and functionality of the idea at hand (Desouza, 2011).

In terms of *pricing,* leaders need to be able to calculate the costs customers or clients will need to incur to adopt and implement the product, service or process offered by the organisation. These costs will be reflected by the actual monies spent by customers or clients, opportunity costs (if customers or clients need to divert their attention from other activities) and even psychological costs (if customers or clients need to overcome mental

blocks such as a fear of change). Leaders should thus be competent in identifying and calculating the opportunity costs involved when customers or clients choose to adopt and implement an idea presented by the organisation in the form of a product, service or process. It is also important that leaders will be able to select an optimal price point for the products, services or processes offered by the organisation that will justify the costs customers or clients will have to incur when adopting the idea. Leaders should not take a casual approach with regard to pricing products, services or processes as inappropriate pricing strategies could lead to ideas being ignored by potential customers or clients (Desouza, 2011).

In terms of *promotion*, advertising and communication strategies will invariably have to be developed with the objective of promoting the idea at hand. Desouza (2011) mentions that communicating an idea to all the potential customers/clients in the market at the same time will not only be costly, but will often be fruitless. A promotion strategy that will be more effective will require that leaders need to identify the target market of the product, service or process offered by the organisation and tailor marketing and promotional strategies to meet the needs of the target market. Determining the specific needs of individuals in the target market would imply that leaders will need to be able to engage in market research initiatives such as conducting interviews and/or surveys, as mentioned earlier (Desouza, 2011).

Measuring the effectiveness of the commercialisation strategy is essential for improving and streamlining the commercialisation process, yet the value of this practise is often overlooked. As a point of departure, leaders will need to define the measurement/evaluation process, the various phases therein and clarity should be provided regarding the attributes of the commercialisation strategy being measured. Leaders should therefore clearly delineate to subordinates what each indicator of commercialisation success is measuring, and how each of the indicators relates to other success indicators (Desouza, 2011). Furthermore, leaders should constantly seek feedback (e.g. interviews, surveys, focus groups, etc) from all customer segments in the market to fully grasp the needs and expectations of potential customers/clients. These measures of customer feedback should then be analysed by leaders and results should be interpreted in the relevant context in order to make sense thereof. Measuring the effectiveness of the commercialisation strategy/process will also require of leaders to engage in external benchmarking efforts and compare results obtained from their organisation with the results of other similar organisations in the industry.

Ultimately there will be no point engaging in measurement efforts and documenting the results thereof if the outputs are not going to be utilised to improve the commercialisation process. Therefore it is essential that leaders will take the results obtained from the

measurement process and make specific adjustments and/or refinements to the commercialisation strategy based upon the results obtained. After the necessary adjustment and/or refinements have been made, leaders will once again measure the effectiveness of the commercialisation strategy/process (i.e. pre – and post test) to determine the impact of the implemented changes.

During the commercialisation phase, ideas are firstly diffused throughout the markets identified by the organisation and secondly customers or clients are assisted by the organisation to utilise the commercialised product, service and/or process successfully. According to Desouza (2011) diffusion and implementation resemble two sides of the same coin. Diffusion refers to the process of generating buy-in and acceptance for the idea, while implementation entails the process of setting up the structures, maintenance, and resources to allow it to be reproduced or brought into effective use.

During diffusion the organisation decides to “go live” with the idea at hand with the objective of determining how the market embraces it. The organisation and specifically leaders, therefore, need to take the necessary time to understand the cultural realties of the environment in which it will deploy the idea(s) – the expectations, values, and behaviours of its identified customers (Desouza, 2011). This would imply that leaders need to be able to communicate effectively with potential customers/clients and possess some degree of “cultural intelligence” as cultural norms and expectations can shape the customer/client’s response to an idea.

During implementation, it remains essential that leaders will possess adequate communication skills. More specifically, the organisation and leaders will need to monitor channels for feedback, both positive and negative, as customers/clients begin engaging with the product/service and/or process commercialised by the organisation. Real-time data will need to be collected on how the product, service and/or process is performing in the marketplace in order to track its performance and compare it with expectations outlined in the commercialisation strategy (Desouza, 2011).

Feeding customer/client input back into the organisation, facilitates and stimulates the innovation process to begin again by allowing the organisation to learn about unmet opportunities for new products, services and/or processes that other parts of the organisation might be able to serve (Desouza, 2011). It should hence be clear that this last phase of the innovation process (i.e. commercialisation phase) does not “end” the innovation process, but rather cycles back to the first phase of idea generation to start the process all over again.

Table 2.5 below will provide a summary of the leadership competencies (i.e. knowledge, skills and attitudes) required for successful completion of the commercialisation phase.

Table 2.5

*Leadership Knowledge, Skills and Attitudes required during the Commercialisation phase*

| | |
|---|---|
| **Knowledge** | Have basic knowledge of the phases involved in the commercialisation process; understand the characteristics of competent work/project/cross-functional teams; possess knowledge of the principles involved in establishing a commercialisation strategy; have knowledge of the resources required to move an idea to the market; understand the basic principles involved in calculating metrics such as return on investment (ROI); have knowledge and awareness of which individuals in the organisation are considered experts in their respective fields; have basic knowledge and understanding of marketing; be aware of the fact that the commercialisation strategy should be revised and/or adjusted routinely; be aware of the opportunity costs customers/clients incur when adopting and implementing an idea; understand that marketing and promotion strategies need to cater to the specific needs of the intended target market; possess knowledge of the principles involved in benchmarking; have basic understanding of "cultural intelligence" and related aspects thereof |

Table 2.5 (continued)

| | |
|---|---|
| **Skills** | Competent in selecting appropriate members in the establishment of cross-functional teams; demonstrate the ability to construct an effective commercialisation strategy; competent in identifying specific resources required to move an idea to the market; demonstrate the ability to engage in successful networking and/or negotiation efforts to acquire needed resources; demonstrate the ability to successfully calculate metrics such as return on investment (ROI); possess networking skills to ensure access to experts; competent in engaging in successful market research initiatives; demonstrate the ability to revise and/or adjust the commercialisation strategy through the various phases in the commercialisation phase; competent in engaging in environmental scanning efforts; demonstrate the ability to time the entry and introduction of ideas to the market appropriately; be competent in calculating and quantifying the opportunity costs incurred by customers/clients when adopting and implementing an idea; demonstrate the ability to select an optimal price point for ideas; competent in designing marketing and promotion strategies that fulfil the needs of the target market; possess the ability to clearly communicate the success indicators of the measurement process to subordinates; competent in analysing and interpreting feedback results in the given context; demonstrate the ability to engage in successful external benchmarking initiatives; demonstrate adequate communication skills |
| **Attitudes** | Open-minded to the preferences of idea creators; value the involvement and input of idea creators in the commercialisation process; be willing to give up a certain amount of control, limit involvement and delegate certain tasks and/or responsibilities to members of commercialisation team; provide sufficient time for the implementation of ideas; be patient when introducing ideas to the market; constantly seek feedback from all customer segments |

## 2.6 Proposed Theoretical Model depicting Leadership knowledge, Skills and Attitudes as Predictors of Innovation Processes and Outcomes

The theoretical model depicted in Figure 2.5 below suggests that specific structural relations exist between the three latent behavioural performance dimensions of innovation leadership (i.e. knowledge, skills and attitudes) and the outcome variables included in the model.

In simple terms, the theoretical model provides an overview of the intricate process whereby innovative outcomes are produced in organisational work teams.

Firstly, the knowledge, skills and attitudes of leaders will influence one another to varying degrees. Secondly, the knowledge, skills and attitudes of leaders will create a team climate for innovation within the organisational context. More specifically, leaders with a positive attitude towards facilitating innovative behaviour in their team members will be more inclined to create an innovative team climate that will facilitate such behaviour in comparison to leaders who do not value innovative behaviour. Similarly, leaders with appropriate sets of innovation-stimulating skills will be more inclined to create an innovative team climate in comparison to other leaders lacking the necessary skill sets. Thirdly, this team climate for innovation will stimulate and facilitate innovative behaviour in team members and accordingly activate innovative team member output. Fourthly, the activation of innovative team member output will result in innovative outcomes for the team in the form of innovative products, services and/or procedures.

It is important to take note of the fact that each of the outcome variables included in the theoretical model (i.e. team climate for innovation, activation of innovative team member output and perceived innovation outcomes of the team) have each been discussed comprehensively during the literature overview of this research study.

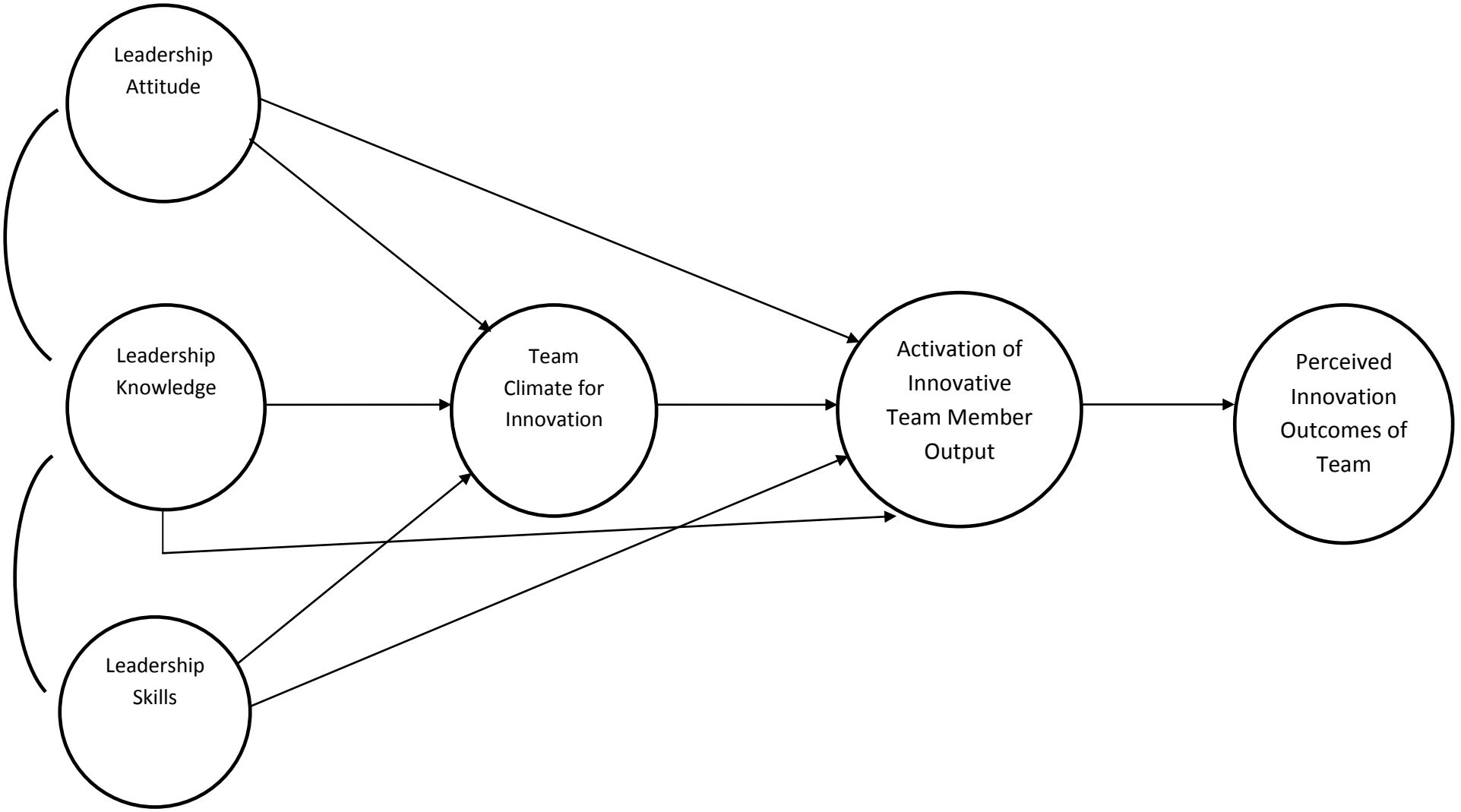


*Figure 2.5* Theoretical model depicting leadership knowledge, skills and attitudes as predictors of innovation processes and outcomes in teams

## 2.7 An Alternative Paradigm: Innovation Leadership Competency Potentials and Competencies

During the development of the research proposal for this research study, it soon became clear through discussions with colleagues that they favour an approach that deals with innovation leadership competencies rather than innovation leadership knowledge, skills and attitudes.

This led to a review of the concepts of competency potentials and competencies. The review revealed how the concepts are related to one another, but also that although they are intertwined, they do in fact differ and should not be regarded as the same construct.

### 2.7.1 Competency potentials

SHL (1994, p.10) describes competency potentials as "individual attributes necessary to produce results, for example *dispositions* (underlying aspects) and *attainments* (knowledge and skills acquired)".

Dispositions are characterised by the potential of an individual to display certain actions, whilst a competency is the confirmation that the individual does indeed display what was predicted. Attainments is an estimate of the knowledge and skills expected to be existent before employment commences, as well as those knowledge and skills expected to be learned during employment (SHL, 1994).

Dispositions include abilities, aptitudes, interests, motives, values, beliefs and styles. Attainments comprise an individual's life biography, are influenced by dispositions and leads to achievements through experience and levels of knowledge, skills and understanding achieved. Whilst dispositions are stable and enduring psychological constructs measured objectively and accurately by assessments that inform long term development potential, attainments are flexible and measured in terms of the mastery of external criteria and indicates a short term developmental influence related to training, learning, development and experience (SHL, 1994).

### 2.7.2 Competencies

SHL (1994, p. 10-11) defines competencies as “sets of behaviours that are instrumental in the delivery of desired results”.

Within research literature there exist two basic views regarding competencies, namely the view considering competencies as attributes causally related to job success and the view considering competencies as bundles of behaviour causally related to job success.

Within the American perspective, competencies are viewed as person attributes and have been formally defined as the “underlying characteristics of a person that results in effective or superior job performance” as well as “underlying personal characteristics which are expressed in observable behaviour and action” (SHL, 1994). It can thus be a motive, trait, aspect of one’s self-image, skills or knowledge that is used (Boyatzis, 1982). Many researchers agree that competencies are the knowledge, skills, abilities and other characteristics (KSAO’s) that are required for effective performance in a job (Campion, Fink, Ruggeberg, Carr, Phillips & Odman, 2011).

From the British perspective, competencies are considered bundles of behaviour. SHL (as cited in Myburgh, 2011) defines competencies as “behavioural actions which, if done well, results in superior performance” and as “sets of related behaviour, arising from underlying aspects of the individual which are determinants of job success”. Bartram (2005, p. 1187) defines competencies as “sets of behaviours that are instrumental in the delivery of desired results or outcomes”. Competencies, according to this view, are regarded as relatively stable sets of behaviours that are instrumental in the delivery of superior performance in terms of the outcomes the individual is held accountable for. It is therefore proposed that individual attributes consist of competencies and competency potentials.

For the purposes of this research study, innovation leadership competencies can be defined as the sets of leadership behaviours which are considered instrumental in facilitating and delivering innovation outcomes throughout the various stages in the innovation process. In line with the above-mentioned definitions, the current research study will focus on the underlying knowledge, skills and attitudes on which the innovation leadership competencies of team leaders in organisational settings are based.

## 2.8 Summary

This chapter has presented an overview of the concepts of creativity and innovation, leadership, competencies and corporate entrepreneurship. The literature review clearly indicated a positive relationship between leadership and innovation within organisational contexts. The existing literature on leadership and innovation reflects a large amount of overlap with regard to leadership competencies based on a specific set of knowledge, skills and attitudes that will stimulate and facilitate innovation in organisational settings. However, literature on leadership competencies and innovation generally refer to the innovation process as a whole without making a clear distinction between the different phases included in the innovation process as well as the characteristics and challenges associated with each phase.

The literature review therefore highlighted the need for a universal framework and a psychological measurement instrument that will clearly measure the leadership competencies (based on a specific set of. knowledge, skills and attitudes) that will stimulate and facilitate innovative behaviour in subordinates – specifically with reference to the different phases in the innovation process.

The following chapter stipulates the procedure that was followed to develop the ILQ psychological measurement instrument.

# CHAPTER 3: RESEARCH METHODOLOGY

## 3.1 Introduction

The objective of this chapter is to describe how the measurement instrument designed in this research study, termed the Innovation Leadership Questionnaire (ILQ), was developed and evaluated psychometrically.

As a point of departure, it is important to take note of the fact that the development and evaluation of the ILQ instrument was based on a specific operational definition of innovation leadership competencies specifically chosen for this research study. For the purpose of this research study innovation leadership competencies can be defined as the sets of leadership behaviours that are considered instrumental in facilitating and delivering innovation outcomes throughout the various stages in the innovation process.

The ILQ was specifically designed with the intention that the test items included in the instrument will reflect specific underlying performance dimensions of leadership competencies that are related to innovative subordinate behaviour. The design of the ILQ therefore implies a specific theoretical model which is based on the belief that the responses of subordinates to the ILQ test items will reveal the underlying knowledge, skills and attitudes exhibited by their innovation leader.

It should thus be clear that the theoretical model maps ILQ items onto specific first-order leadership performance factors, thereby claiming that the responses to these ILQ items reflect the state of the underlying first-order factor to which it is linked.

In order to determine the content validity of the ILQ, the measurement instrument was subjected to a systematic and rigorous evaluation procedure. Firstly, a panel of experts in the field of creativity and innovation reviewed the items included in the ILQ. The panel of experts commented on various considerations which need to be taken into account when constructing an instrument such as the ILQ and these considerations included, but were not limited to, aspects such as the cultural, linguistic and gender appropriateness of the ILQ. Secondly, a pilot study was conducted on a representative sample of team leaders and their respective subordinates from the target population with the experimental version of the ILQ. Results obtained from the pilot study provided important information with regard to the reliability and validity of the ILQ as a credible psychological measurement instrument.

Eventually, after the necessary changes had been effected, the concurrent validity of the ILQ was determined by correlating the ILQ ratings of leaders with their KEYS and PORGI scores

as evaluated by subordinates. In order to overcome problems associated with common method bias, leaders and subordinates each completed a version of the ILQ, KEYS and PORGI individually.

The research methodology used in this research study to develop the ILQ serves the epistemic ideal of science (Babbie & Mouton, 2001). Making use of a research methodology that is flawed or unclear will jeopardise the possibility of arriving at valid conclusions regarding the merit of the proposed measurement model hypothesising the nature of the constructs included in the ILQ as well as the manner in which the instrument measures these constructs. As a result, conclusions regarding the ability of the ILQ to measure the specific leadership competencies that will stimulate and facilitate innovative behaviour in subordinates, via its premeditated design, could be fundamentally flawed. This would seriously impair the credibility of the results regarding the merit of the ILQ as a valid measure of leadership competencies and will erode confidence in the use of the ILQ as a predictor of the ability of a leader to facilitate innovation.

Babbie and Mouton (2001) state that scientific rationality can only serve the epistemic ideal of science if the method(s) implemented during the scientific inquiry process is described comprehensively and methodological choices made during scientific inquiry are motivated thoroughly.

The following section will therefore provide a comprehensive description and motivation of the underlying research methodology that was utilised to develop the ILQ in this research study.

## 3.2 Steps in the Development of the Innovation Leadership Questionnaire (ILQ)

Developing a measure such as the ILQ requires rigorous and systematic planning on the part of test developers to ensure that the psychological measurement instrument at hand will serve the epistemic ideal of science. Foxcroft and Roodt (2005) mention that psychological measurement instruments need to be planned thoroughly, items need to be written carefully, and the initial version of the measure needs to be administered to determine the effectiveness thereof. After this, the final items out of which the measure will consist will be chosen and the measure will be administered to a representative group of individuals from the target population so that the measure's validity, reliability and norms can be established.

### 3.2.1 Planning phase

Throughout the process of developing a psychological measurement instrument, such as the ILQ, test developers need to implement a blueprint or plan that will ultimately serve as a guideline for the development of the instrument at hand. In the case of the ILQ, the test developers formulated a planning guideline which specified the components included in the ILQ, specifications which the ILQ will need to comply with, as well as specific dates and timelines outlining the developmental progress of the ILQ.

#### *3.2.1.1 Specifying the aim of the measure*

The aim of the ILQ is to provide an accurate indication of the extent to which team leaders possess the necessary competencies (based on a specific set of. knowledge, skills and attitudes) to stimulate and facilitate innovative work behaviour in their subordinates.

The ILQ is in the form of a paper-and-pencil test and was designed to be completed individually by both leaders and their subordinates in various work teams. Subordinates rate their immediate team leader on the ILQ, via a five point Likert-type rating scale, and more specifically the extent to which they believe their team leader displays specific competencies associated with the various phases in the innovation process. Additionally, the team leader may also complete the ILQ and rate themselves and more specifically the extent to which they believe they display specific competencies throughout the various phases of the innovation process. In this way the instrument could provide a 360° evaluation of the competencies of team leaders.

Data obtained from the ILQ's in the research study could therefore be utilised to determine the extent to which team leaders are capable of stimulating and facilitating innovative behaviour in their subordinates. As mentioned earlier, the ILQ clearly distinguishes between the different phases in the innovation process and this will enable test administrators to identify specific strengths and weaknesses of leaders with reference to each of the stages in the innovation process. What makes this more useful is the fact that management will be able to utilise results obtained from the ILQ and customise future training and development initiatives to address specific shortcomings of leaders.

It is important to emphasise the fact that the ILQ will be more suitable for leaders and subordinates functioning in general work teams within organisational settings. In short, the functions and roles fulfilled by leaders and subordinates in highly specialised work teams are

so specific and intricate that the criteria made use of in the ILQ may be considered too general. For instance, leaders and subordinates functioning in large high-technology organisations often fulfil specialised roles and functions that will simply not be present in general work teams. Accordingly, the ILQ will not assess the complex nature of these highly specialised roles and functions sufficiently due to its generalised nature. Large high-technology organisations represent a smaller segment of not only the South African business sector, but also the global business sector and therefore it was decided that a general approach to evaluating the competencies of leaders in innovative work teams will be adopted.

#### *3.2.1.2 Defining the content of the measure*

The content of any psychological measurement instrument will ultimately be directly related to the purpose of the instrument at hand. In a similar fashion, decisions with regard to the domains of content that should be included in the experimental version of the ILQ were ultimately dictated by the purpose thereof.

As a point of departure, the constructs (content domain) tapped by the various dimensions of the ILQ was operationally defined. This was done by way of a thorough literature study regarding the main theoretical viewpoints of the constructs measured by the ILQ. Constructs included in the ILQ were comprehensively defined in the literature study and included creativity, innovation, phases in the innovation process, critical roles fulfilled by leaders, as well as leadership competencies based on a specific set of knowledge, skills and attitudes.

McIntire and Miller (2000) mention that in organisational settings, test developers will base the operational definition of the construct(s) to be tapped by the measurement instrument at hand on a thorough job analysis that will identify the knowledge, skills and attitudes needed to perform a specific job successfully. This approach was followed during the construction of the ILQ by studying the findings regarding the knowledge, skills and attitudes that collectively form leadership competencies that will stimulate and facilitate innovative behaviour in team members, found in the existing research literature.

Test developers will rarely only make use of one approach when it comes to operationalising the content domains of a measurement instrument. Therefore, the more rational or analytical approach is often combined with the empirical criterion keying approach to ensure that the resultant measure is theoretically grounded, as well as being linked to an important criterion (Foxcroft & Roodt, 2005). This approach to test development was followed in the

construction of the ILQ to ensure that the content of the instrument will be grounded in theory as this will improve the reliability and validity of the instrument.

Ultimately the purpose of the ILQ psychological measurement instrument is to distinguish between leaders who possess the necessary competencies to stimulate and facilitate innovative behaviour in their subordinates and those leaders whom fail to do so. The ILQ will therefore provide detailed information regarding the specific levels of competencies leaders of innovative work teams' display throughout the different phases in the innovation process.

#### *3.2.1.3 Developing the test plan (specifications)*

It is important to take the format of any psychological measurement instrument into account and it was no different for the ILQ. McIntire and Miller (2000, p. 192) state that test format consists of two aspects, namely 'a *stimulus* to which a test taker responds and a *mechanism* for response'.

Test items included in a psychological measurement instrument will serve as the stimulus for test takers. In terms of the ILQ, test items were presented to test takers in the form of a five point Likert-type rating scale. The five points on the Likert type rating scale correspond to a rating of "how true" a specific statement is with reference to the competencies displayed by the respondent's team leader during the innovation process (*to no extent, to a little extent, to some extent, to a great extent or to a very great extent*).

As mentioned earlier, the decision with regard to the item format utilised in the ILQ was largely determined by the constructs measured by the ILQ, but practical and logistical considerations also influenced the choice of format. For instance, in most cases the ILQ will be administered in a work team consisting of multiple team members and each will have to evaluate the competencies of his/her team leader. Due to the fact that the ILQ will predominantly be administered in team contexts with multiple respondents, it is essential that test administrators will be able to score completed versions of the ILQ's easily and efficiently. Therefore it was decided to make use of fixed response items (multiple-choice and Likert-type rating scales) in the ILQ as it will enable test administrators to score high volumes of completed ILQ's with little effort in comparison to other format types such as essay-type or open-ended test formats.

When it comes to the method of responding to test items, various formats exist. In the case of the ILQ, test takers will rate the competencies of their leader on a 5-point Likert type scale on the basis of their own personal perception and/or judgement. It is important to take note

of the fact that bias can be introduced unintentionally by either the item stimulus or the mode of response in a psychological measurement instrument. Similarly, Hambleton (2001) mentions that it is critically important to pay attention to the potential of method and response bias, especially when the measure is developed for use with multicultural test-takers. Test-takers are often a potential source of bias themselves as they might respond by using a specific style or response set (e.g. by agreeing with all the statements) which might result in false or misleading information. Test developers should try to minimise the possibility of response sets influencing the test results through the way they construct the test items (Foxcroft & Roodt, 2005). Taking all of these factors into account, items included in the ILQ were written in a short, simple and concise format to ensure that test takers are able to read and understand the content of each item unambiguously.

Another important consideration that was taken into account at this stage involved the eventual length of the ILQ. The length of a psychological measurement instrument such as the ILQ will be partly influenced by the time availability to administer the instrument as well as the ultimate purpose of the instrument at hand. The ILQ taps into three dimensions of leadership competencies (knowledge, skills and attitudes) and four successive innovation stages, and will thus include more items compared to a generic measurement instrument merely focusing on the performance dimension of leadership.

It was accordingly decided that the experimental version of the ILQ will initially include 115 test items as some items will be discarded from the ILQ after it is reviewed by a panel of experts and evaluated psychometrically. It is important to take note of the fact that a lack of test items with respect to specific performance dimensions measured by an instrument will invariably have a negative impact on the reliability and validity of any psychological measurement instrument.

After considering the degree to which the items measure the underlying construct/s, the item and response format, instrument length, and number of test items included in the instrument, it will be possible to develop a clear conceptualisation of the specifications of the ILQ. All of these specifications were formalised in a measurement plan depicting the content domains included in the ILQ, as well as the number of items included in each content domain. The measurement plan for the experimental version of the ILQ emphasised that the instrument would consist out of four major sections, each representing the four different phases in the innovation process.

Murphy and Davidshofer (2005) state that by grouping similar items together under each major and sub-dimension, test developers will be able to generate multiple observations of the same behaviour or trait at hand. This was ultimately the purpose of the ILQ, as the

instrument makes a clear distinction between the four different phases in the innovation process to allow the specific evaluation of leadership competencies with reference to each of the four phases.

### 3.2.2 Item development

The following section will provide an overview of the systematic process whereby test items were written and reviewed for the ILQ.

#### *3.2.2.1 Writing the items*

The purpose and specifications of the ILQ provided important guidelines for the manner in which test items were formulated for the instrument. Resources consulted during the item writing process included, but were not limited to existing measures, theories, text books, as well as consultations with subject experts in the field of leadership and innovation.

Throughout the process of writing the test items for the ILQ, various considerations had to be taken into account by the test developers.

Firstly, the test developers made sure that the wording of test items included in the ILQ is easily understandable and to the point. Clumsy wording and long, complex sentences often make it difficult for test-takers to understand what is required of them when completing psychological measurement instruments. The test developers made sure that the vocabulary used in the ILQ is appropriate for the targeted test-takers. Individuals completing the ILQ will predominantly consist of team members functioning in small - to medium size organisations. It can hence be assumed that the average test taker will have a minimum qualification of Grade 10 or higher and therefore provision was made to keep the vocabulary of test items as simple and straightforward as possible.

Thirdly, in line with research conducted by Murphy and Davidshofer (2005), the test developers carefully considered the wording of items included in the ILQ to avoid the use of double negatives and ambiguous test items. The inclusion of ambiguous test items will not only waste unnecessary time as test-takers struggle to understand it, but will also result in wrong interpretations on the part of test-takers and ultimately invalid results. Fourthly, the test developers made sure that the nature of the content covered in each section of the ILQ is indeed relevant to the specific construct being measured in that particular section of the instrument. In other words, each section of the ILQ consists of specific test items that have

been grouped together and the response of test takers to these items will be directly related to a specific underlying performance dimension of innovation leadership.

Fifthly, test developers were aware of the fact that some of the test items included in the experimental version of the ILQ would be discarded during the refinement of the instrument. The refinement procedures utilised will typically be in the form of feedback obtained from a panel of experts regarding the ILQ, as well as psychometric evaluations of the instrument. In order to make provision for the possible elimination of test items, test developers included 115 test items in the experimental version of the ILQ. The inclusion of a large number of test items will ensure that even if some test items are eliminated from the ILQ during later stages, the reliability and validity of the instrument will not decrease, but may actually increase.

#### *3.2.2.2 Reviewing the items*

The research proposal for this study was presented to a panel of experts at the Department of Industrial Psychology at the University of Stellenbosch. The panel of experts included five members, namely Prof DJ Malan, Prof Amos Engelbrecht, Mr Francois De Kock, Prof Callie Theron and Dr Billy Boonzaier. The panel of experts reviewed the ILQ and judged whether the test items included in the experimental version of the instrument sufficiently tap the content domains and/or dimensions of the constructs being assessed.

During the research proposal presentation the panel of experts commented on several aspects of the ILQ and provided valuable feedback on certain elements of the instrument. Most notably, the panel of experts proposed that the experimental version of the ILQ (mainly depicting leadership knowledge, skills and attitudes as predictors of innovative behaviour in team members) should rather be presented in a competency based framework. Additionally, the panel of experts commented on the cultural, linguistic and gender appropriateness of the test items included the experimental version of the ILQ. The wording of test items included in the ILQ, as well as the nature of the stimulus materials included in the instrument was analysed by the panel of experts and found to be satisfactory.

On the basis of the feedback from the panel of experts each of the test items in the experimental version of the ILQ was reviewed and re-written in a competency based format. It was accordingly decided to make use of the SHL Great Eight competency framework to serve as the basis for the construction of the competency-based version of the ILQ. The knowledge, skills and attitudes of team leaders was hence theoretically linked to the appropriate leadership competencies forming part of the SHL Great Eight competency

framework. After the revision of all the items in the experimental version of the ILQ, the number of items included in the instrument decreased from 115 to 68 test items.

Upon completion, the revised version of the experimental version of the ILQ was presented to subject experts who approved of the changes that were made to the experimental version of the instrument.

In line with research conducted by Foxcroft and Roodt (2005) the pool of 68 test items included in the experimental version of the ILQ was administered to a small number of individuals from the intended target population and qualitative information was obtained with regard to test items and test instructions test takers had difficulty understanding.

The framework depicted in Table 3.1 below will illustrate how test items included in the experimental version of the ILQ cluster together to form item parcels, dimensions and competencies. From the framework it will be evident how certain test items in the instrument are linked to each of the eight competencies of the SHL Great 8 competency framework.

*Table 3.1*

Framework depicting the content of the Innovation Leadership Questionnaire (ILQ)

| ILQ Competency | SHL Great 8 Competency | Competency Dimension | Leadership Behaviour on ILQ | Item Parcel |
|---|---|---|---|---|
| 1. Leading and Empowering Team Members | 1. Leading and Deciding | 1.1. Deciding and Initiating Action | 2. My supervisor successfully implements idea generation activities (e.g. brainstorming sessions, focus group discussions, strategy sessions, etc).<br>17. My supervisor successfully implements practices and procedures allowing team members to effortlessly submit ideas they generated (e.g. suggestion box, Intranet forums, etc).<br>21. My supervisor successfully implements the necessary practices and/or procedures for advocating and screening new ideas.<br>34. My supervisor effectively conducts feasibility research to determine the extent to which ideas can be implemented and commercialised successfully into the market. | 1.1.5. Taking Action |
| | | | 1. My supervisor effectively formulates an innovation vision for our team at the start of the idea generation process. | 1.2.1. Providing Direction and Coordinating Action |
| | | 1.2. Leading and Supervising | 10. My supervisor successfully mentors and/or coaches team members during the process of idea generation.<br>42. My supervisor effectively mentors and/or coaches team members during feasibility research practices/procedures.<br>46. My supervisor role-models creative behaviours during feasibility research which promotes a learning organisational culture in our organisation. | 1.2.3. Coaching |
| | | | 18. My supervisor avoids the use of highly detailed workplans and tight control during idea generation efforts as it will inhibit the creativity efforts of team members.<br>20. My supervisor empowers team members effectively during the idea generation process by providing them with sufficient freedom and autonomy.<br>31. My supervisor provides team members with the necessary freedom and autonomy to ensure that everyone feels empowered and participates in the idea screening process.<br>35. My supervisor successfully trains and/or educates team members how to conduct feasibility research on their own.<br>39. My supervisor effectively empowers team members by providing them with the freedom and autonomy to engage in feasibility research activities. | 1.2.5. Empowering Staff |
| | | | 12. My supervisor effectively motivates team members during challenging periods in the idea generation process. | 1.2.6. Motivating Others |

| | | | | |
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| 2. Recognising and Valuing Team Member Input | 2. Supporting and Cooperating | 2.1. Working with People | 9. My supervisor makes effective use of rewards to promote the creative efforts of team members during idea generation.<br>19. My supervisor successfully acknowledges the creative efforts and contributions of team members during the idea generation process. | 2.1.4. Recognising and Rewarding Contributions |
| | | | 29. My supervisor provides constructive and timely feedback to team members whose ideas have been screened. | 2.1.7. Communicating Proactively |
| | | | 13. My supervisor manages to engage team members in idea generation activities without hesitation by way of his/her social/interpersonal skills.<br>30. My supervisor effectively promotes the discussion and evaluation of different ideas amongst team members during idea screening activities. | 2.1.1. Understanding Others |
| | | | 11. My supervisor avoids criticising the idea generation efforts of team members prematurely as it will decrease the creativity efforts of team members.<br>36. My supervisor considers the mistakes and failures of team members during the feasibility phase as invaluable learning experiences.<br>41. My supervisor informs team members that most ideas fail during feasibility research and regardless of the outcomes it is considered an invaluable learning experience.<br>68. My supervisor considers the mistakes and failures of team members during the commercialisation process as invaluable learning experiences. | 2.1.8. Showing Tolerance and Consideration |
| | | 2.2. Adhering to Principles and Values | 48. My supervisor values and utilises the diverse backgrounds and opinions of team members throughout feasibility research activities.<br>54. My supervisor assembles cross-functional teams that consist out of diverse team members with complementary skills and knowledge to commercialise our products, services or processes. | 2.2.3. Utilizing Diversity |
| 3. Influencing Key Stakeholders | 3. Interacting and Presenting | 3.1. Relating and Networking | 24. My supervisor networks effectively with idea advocates from other business units/teams/departments to screen new ideas.<br>53. My supervisor networks effectively with members from other departments and business units to create cross-functional teams that will commercialise our products, services or processes.<br>59. My supervisor networks effectively in order to provide team members with access to experts during the commercialisation process. | 3.1.2. Networking |
| | | 3.2. Persuading and Influencing | 6. My supervisor successfully persuades members of management to obtain the time/resources necessary for idea generation to occur.<br>23. My supervisor often acts as an idea advocate and persuades management of the potential value of ideas submitted by team members.<br>25. My supervisor effectively persuades members of management to obtain the | 3.2.5. Negotiation |

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|---|---|---|---|---|
| | | | necessary resources and support for establishing practices and/or procedures to screen the ideas of team members.<br>45. My supervisor effectively persuades members of management to provide the necessary time/resources required for feasibility research to occur.<br>55. My supervisor effectively persuades members of management to provide the necessary time/resources required for commercialisation to occur.<br>56. My supervisor effectively negotiates with suppliers to commercialise our products, services and/or processes successfully into the market. | |
| | | 3.3. Presenting and Communicating Information | 5. My supervisor effectively communicates the innovative vision of our team to team members.<br>50. My supervisor communicates the commercialisation strategy to team members successfully.<br>63. My supervisor clearly communicates the criteria (success indicators) that are made use of to evaluate how successful team members commercialised our products, services or processes. | 3.3.3. Articulating Key Points of an Argument |
| | | | 8. My supervisor presents idea generation activities in a way that is intellectually stimulating for team members. | 3.3.4. Presenting and Public Speaking |
| 4. Applying Technical Expertise | 4. Analysing and Interpreting | 4.2. Applying Expertise and Technology | 14. My supervisor makes valuable contributions to idea generation activities because of his/her technical expertise.<br>22. My supervisor possesses sufficient technical expertise to know which ideas should be advocated and/or supported.<br>38. My supervisor has the technical expertise to successfully determine the commercial and technical feasibility with which ideas can be introduced into the market.<br>58. My supervisor has the technical expertise to calculate and interpret profitability metrics (e.g. return-on-investment, etc) during the commercialisation process successfully.<br>64. My supervisor possesses sufficient technical expertise to analyse and interpret the results obtained from market research studies successfully during commercialisation. | 4.2.1. Applying Technical Expertise |
| | | 4.3. Analysing | 3. My supervisor is curious and frequently challenges the *status quo* during idea generation activities. | 4.3.2. Testing Assumptions and Investigating |
| | | | 15. My supervisor successfully solves problems that arise throughout the idea generation process in a creative fashion. | 4.3.3. Producing Solutions |
| | | | 28. My supervisor objectively screens the ideas of team members during idea screening. | 4.3.1. Analyzing and Evaluating Information |

| | | | | |
|---|---|---|---|---|
| 5. Strategy Development | 5. Creating and Conceptualising | 5.1. Learning and Researching | 43. My supervisor successfully documents and records the information and results obtained from feasibility research activities.<br>60. My supervisor successfully gathers information throughout the commercialisation process by way of market research (e.g. market survey, interviews, etc). | 5.1.2. Gathering Information |
| | | 5.3. Formulating Strategies and Concepts | 49. My supervisor effectively formulates a commercialisation strategy for our team's products, services or processes. | 5.3.3. Setting and Developing Strategy |
| 6. Goal-Setting and Activity Alignment | 6. Organising and Executing | 6.1. Planning and Organising | 7. My supervisor makes effective use of goal-setting to enhance the creative efforts of team members during idea generation. | 6.1.1. Setting Objectives |
| | | | 51. My supervisor provides sufficient time for team members to implement and commercialise new ideas. | 6.1.3. Managing Time |
| | | | 16. My supervisor assembles resources effectively to create an ideal setting/environment for successful idea generation efforts to occur in. | 6.1.4. Managing Resources |
| | | 6.2. Delivering Results and Meeting Customer Expectations | 65. My supervisor formulates marketing strategies that effectively caters to the unique needs of our target market during the commercialisation process. | 6.2.1. Focusing on Customer Needs and Satisfaction |
| | | 6.3. Following Instructions and Procedures | 32. My supervisor screens ideas in a transparent fashion based on clear evaluation criteria that is readily available to team members.<br>47. My supervisor informs team members that proof of an idea's feasibility will be reflected by way of evidence and factual data gathered during feasibility research. | 6.3.2. Following Procedures |
| 7. Adapting and Accepting New Ideas | 7. Adapting and Coping | 7.1. Adapting and Responding to Change | 44. My supervisor effectively utilises the positive and negative feedback obtained during the feasibility phase to refine and adjust the feasibility research process accordingly.<br>61. My supervisor successfully uses information gathered from market research activities to revise and/or adjust the commercialisation strategy. | 7.1.1. Adapting |
| | | | 33. My supervisor values the opinions of potential customers/clients during the screening of new ideas.<br>37. My supervisor values the ideas, suggestions and critique of prospective customers/clients during feasibility research. | 7.1.2. Accepting New Ideas |
| | | | 67. My supervisor knows that the cultural differences of our customers/clients will influence their decision whether or not to adopt our products, services or processes during commercialisation. | 7.1.4. Showing Cross-Cultural Awareness |
| | | 7.2. Coping with Pressure and Setbacks | 40. My supervisor handles the criticism of potential customers and clients during the feasibility phase in a constructive manner. | 7.2.5. Handling Criticism |

| | | | | |
|---|---|---|---|---|
| 8. Monitoring Opportunities and Commercialisation | 8. Enterprising and Performing | 8.2. Entrepreneurial and Commercial Thinking | 4. My supervisor constantly monitors the environment to generate new ideas and capitalise on the opportunities and threats that exist in the external environment.<br>57. My supervisor times the entry and introduction of our products, services or processes into the market effectively during commercialisation.<br>62. My supervisor constantly monitors the external environment for new commercialisation opportunities.<br>66. My supervisor successfully conducts benchmarking studies/comparisons during commercialisation with competitors in our industry. | 8.2.1. Monitoring Markets and Competitors |
| | | | 26. My supervisor successfully screens new ideas in terms of current trends, opportunities and threats he/she observes in the external environment. | 8.2.2. Identifying Business Opportunities |
| | | | 27. My supervisor screens new ideas in relation to the core business of our team and its markets.<br>52. My supervisor is aware of the resources that are required to implement and commercialise an idea into the market successfully. | 8.2.5. Keeping Aware of Organizational Issues |

### 3.2.3 Assembling and pre-testing the experimental version of the measure

Several practical considerations were taken into account during the preparation of the experimental version of the ILQ for its first trial administration.

#### *3.2.3.1 Arranging the items*

Test items included in the experimental version of the ILQ was purposefully arranged in a logical and systematic fashion to assist test-takers with the completion thereof.

The experimental version of the ILQ contains four distinct sections (idea generation, idea screening, feasibility and commercialisation), each representing one of the four phases included in the innovation process. The four sections follow the exact sequence of the four phases in the innovation process which progress from the idea generation phase to the culmination of the process in the form of innovative products, services or processes during the commercialisation phase.

A consideration that had to be taken into account by the test developers involves the fact that the SHL Great 8 competency framework presents the competencies that will be necessary for successful work performance in general terms. It was therefore decided to rather rename each of the SHL Great 8 competencies in terms of the subset of aspects that pertain specifically to the innovation process and the resultant concepts were called innovation leadership competencies.

As mentioned earlier, the purpose of test items included in the ILQ (see Table 3.1) is to measure specific leadership competencies. In order to measure these leadership competencies similar ILQ test items are clustered together in the form of item parcels, dimensions and innovation leadership competencies categorised in terms of the SHL Great 8 competency framework.

Item parcels represent the lowest-order measure included in the ILQ and represent different test items that cluster together to measure a specific aspect of innovation leadership behaviour. The dimensions represent the middle-order measures included in the ILQ and consist of item parcels that cluster together and measure a specific dimension of a competency. The innovation competencies represent the highest-order measures included in the ILQ and will consist of different dimensions that cluster together and measure a specific innovation leadership competency in correspondence with the SHL Great 8 competency framework.

#### *3.2.3.2 Finalising the length*

After confirming the experimental item pool included in the ILQ the following step involved the finalisation of the eventual length of the experimental version of the ILQ. It is important to consider the amount of time test takers will require to read all the test-items included in the instrument when finalising the length of an instrument such as the ILQ.

It is common knowledge that the more content test takers have to read, the longer it will take them to complete a psychological measurement instrument. The test developers of the experimental version of the ILQ took several considerations into account with the finalisation of the length of the instrument. Firstly, test takers were allowed ample time to complete the experimental version of the ILQ. Administering the ILQ to a sample of the target population indicated that it took approximately ten minutes to complete the ILQ and test takers were therefore given approximately an hour to complete all the instruments utilised in this study. Secondly, the multiple-choice format, as well as clear and concise writing style associated with the test items, will assist test takers in effortlessly completing the ILQ. Thirdly, the number of test items included in the experimental version of the ILQ was 68, which could be considered reasonable in terms of length – specifically in its multiple-choice format.

The test developers were satisfied with the final length of the experimental version of the ILQ - it was therefore decided to keep all 68 items included the experimental version of the ILQ as the unnecessary deletion of test items might result in under-representation of the theoretical constructs included in the instrument.

#### *3.2.3.3 Answer protocols*

The experimental version of the ILQ was presented to test takers in the form of a paper-and-pencil test and therefore participants in the research study completed the ILQ by hand and in hard copy. The test developers decided to follow this approach as it will not only aid the scoring procedure for test administrators, but also assist with logistical implications of the research study such as the distribution and collection of completed ILQ's.

#### *3.2.3.4 Developing administration instructions*

The experimental version of the ILQ was accompanied by straightforward and unambiguous administration instructions for test administrators to make use of during the experimental try-

out of the instrument. To ensure that these administration instructions were user-friendly and efficient it was pre-tested on a sample of test administrators from the intended target population. Test administrators did not have any difficulty understanding the administration instructions and considered it to be straightforward.

Educating and training test administrators with regard to the implementation and administration of the experimental version of the ILQ was assigned a high priority by the test developers. Accordingly, meetings were arranged with all the test administrators to clearly delineate the manner in which the ILQ should be implemented during the research study. Failing to realise the important role of administration instructions can be a costly error on the part of test administrators as it could impact negatively on the performance of test items during the experimental pre-testing phase. For instance, poorly worded administration instructions, rather than poorly constructed test items, could result in poor performance on certain test items included in the experimental version of the ILQ.

#### *3.2.3.5 Pre-testing the experimental version of the measure*

The experiential version of the ILQ was administered to a representative sample of the target population to gather data for the study.

The data collection procedure was conducted according to the American Psychological Association's ethical guidelines. The questionnaires utilised in the study clearly indicated to research participants that the results of the study will remain confidential and their involvement will be kept anonymous. Only the researcher had access to the responses of the questionnaires utilised in the study and access to questionnaire responses were secured by a password. Additionally, the Research Ethics Committee (REC) of the University of Stellenbosch granted clearance for this research study. The questionnaires utilised in the study were delivered at each of the organisations identified by the researcher and the 335 completed questionnaires were collected from the organisations by the researcher.

Besides gathering quantitative information regarding the performance of each test item during this pre-testing phase, individuals responsible for administering the instrument was also encouraged to gather qualitative information during this phase. This included information about specific items test-takers seemed to find difficult or did not understand well which will be valuable during the phases of item refinement and ultimately the final selection of items to be included in the ILQ (Foxcroft & Roodt, 2005).

Additional sources of valuable information gathered during this phase included the manner in which test takers responded to the stimulus materials of the ILQ, the order or sequence of test items included in the ILQ, as well as the eventual length of the instrument. The test developers made use of all the information gathered during this pre-testing phase to refine and adjust certain elements of the experimental version of the ILQ.

#### *3.2.3.6 Sampling*

The population represents the total collection of elements about which the researcher wishes to make inferences (Blumberg, Cooper & Schindler, 2008). To pre-test the experimental version of the ILQ instrument on the entire population would not have been feasible. Therefore, a representative sample was drawn to administer the experimental version of the ILQ. This essentially means that a subset or segment of the population was regarded as representative of the population at hand (Bell & Bryman, 2003).

Sampling techniques can be classified as either probability or non-probability sampling. In the case of probability sampling all the elements in a population have an equal chance of being selected for the representative sample (Babbie, 2010). In contrast, non-probability sampling involves the procedure whereby participants are selected on the basis of availability and willingness (Gravetter & Forzano, 2009). It should therefore be clear that this research study made use of non-probability sampling.

Firstly, human resource managers from various South African organisations considered to be innovative were contacted via email. The email provided an overview of the research study, which included the objectives, procedure, as well as benefits for those work teams involved. Secondly, the human resource managers communicated with specific innovative work teams in their organisation and communicated the overview of the research study to these teams. Thirdly, the human resource managers informed the researchers of the number of teams and individuals who agreed to take part in the research study. Fourthly, the researcher delivered the questionnaires, numbered and packaged separately to differentiate between specific teams, to the organisation's premises. Fifthly, the questionnaires were distributed to the relevant teams and personally collected by the researcher upon completion.

A statistical analysis was conducted on the raw data and upon completion a report of the results was printed for each of the teams involved in the research study. Meetings were held

with the respective human resource managers and the findings of the research study were discussed pertaining to each of the teams involved.

As mentioned earlier, the innovative work teams that participated in the data collection for the pre-testing of the ILQ instrument originated from the retail, information technology, government, financial services, telecommunications, agriculture and manufacturing industries in South Africa. More specifically Table 3.2 below will provide a breakdown of the number of research participants from each industry. Further demographic information was unfortunately not recorded.

*Table 3.2*

Research participants per industry/sector during pre-testing of the ILQ instrument

| Industry | N | % in sample |
|---|---|---|
| Retail | 30 | 8.96 |
| Information Technology | 44 | 13.13 |
| Government | 20 | 5.97 |
| Financial Services | 46 | 13.73 |
| Telecommunications | 99 | 29.55 |
| Agriculture | 91 | 27.16 |
| Manufacturing | 5 | 1.49 |

### 3.3 Testing the Proposed Theoretical Model

The proposed theoretical model refers to the individual test items included in the experimental version of the ILQ and how they are related to, the four sections (i.e. idea generation -, idea screening -, feasibility - and commercialisation phase) thereof, and how these four sections are related to the total ILQ score.

In order to determine the validity of the claims proposed by the theoretical model, the competencies included in the ILQ, as well as the total score will be evaluated

psychometrically. More specifically, each of the sections will be correlated with the other sections as it will provide valuable information with regard to the relationships between the various sections in the model. The psychometric analysis of the theoretical model will take place by way of successive internal consistency analyses, inter-correlations, as well as an exploratory factor analysis.

The adapted theoretical model depicted in Figure 3.1 below is based on the operational definition of innovation leadership in this specific research study. The theoretical model illustrates how innovation leadership competencies consists out of sets of leadership behaviours which are instrumental in facilitating and delivering innovation outcomes throughout the various stages in the innovation process.

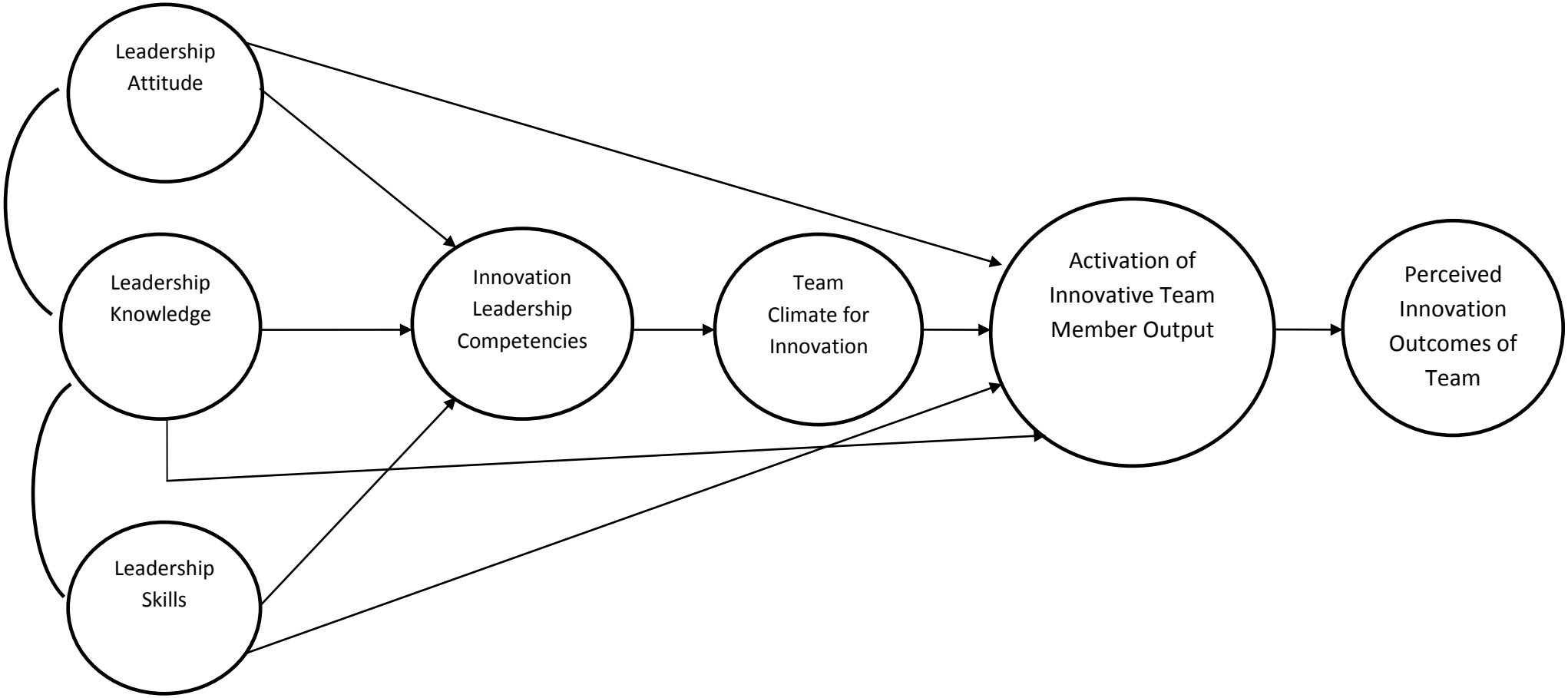


*Figure 3.1* Adapted theoretical model depicting leadership knowledge, skills and attitudes as predictors of innovation processes and outcomes in teams.

### 3.4 Measurement Instruments/Operationalisation

Diamantopoulos and Sigauw (2000) indicate that if the quality of measurements cannot be trusted, then any assessment of the substantive relations of interest will be problematic. In order to respond to this challenge research evidence obtained from literature regarding the reliability and validity of the selected measurement instruments will be presented to justify the choice of these specific measurement instruments.

In order to evaluate the validity of the ILQ and its dimensions in relation to the successive dependent variables, team leaders and their subordinates will be asked to complete the KEYS, Assessing the Climate for Creativity, measurement instrument, as well as the Perceived Organisational Innovativeness (PORGI) measurement scale. More specifically, subordinates will each complete a version of the ILQ, the KEYS, as well as the PORGI measurement instruments. Team leaders, in contrast, will each complete a slightly adapted version of the KEYS and PORGI measurement instruments. Scores obtained on the various measures of the dependent variables by both team leaders and their respective subordinates will then be correlated with the obtained ILQ scores in order to assess the criterion validity of the ILQ and its dimensions.

For example, if subordinates evaluate the knowledge, skills and attitudes of their leaders positively (i.e. they manage to stimulate and facilitate innovative behaviour in subordinates successfully) then surely this should be reflected by way of positive scores obtained on the climate for innovation and perceived organisational innovativeness measurement instruments. The contrary will also be true, lower scores obtained on the ILQ should logically be accompanied by weak ratings on the creative climate and perceived organisational innovativeness measurements.

The following section will provide an overview of the psychological measurement instruments that have been included in this research study.

#### 3.4.1. KEYS: Assessing the climate for creativity measurement instrument

The KEYS, Assessing the Climate for Creativity, measurement instrument was designed to provide reliable and valid assessments of aspects of organisational work environment perceptions that are likely to influence the generation and development of creative ideas (Amabile, Burnside & Gryskiewicz, 1995).

The instrument is of an acceptable scientific quality and is well documented in peer-reviewed literature (Mathisen & Einarsen, 2004). The original version of the KEYS includes 78 items, but for practical reasons an abbreviated version of KEYS consisting of 24 items was utilised in this research study. The abbreviated version of the KEYS has been selected according to specific componential parameters (Amabile et al., 1995), (a) the encouragement by the organisation, (b) the encouragement by the hierarchy, (c) the support of the group, (d) sufficient resources, (e) the challenge, (f) autonomy in work, (g) pressure as well as (h) organisational obstacles. It should be noted that each item included in the instrument has been selected with the purpose of acquiring specific information regarding that construct within the work environment.

Rosello and Tran (2010) made use of the abbreviated instrument in a research study conducted in high-technology organisations in France. Of the 24 principle items included in the instrument, 20 describe the work environment and the remaining four refer to the creativity and productivity of the organisation at hand. The work environment is assessed in terms of “stimulant scales” and “obstacle scales”. Stimulant scales are those scales predicted to be positively related to creativity, whilst obstacle scales are those predicted to be negatively related to creativity.

The original study of the KEYS instrument by Rosello and Tran (2010) included the measure’s norms, factor structure, reliability of the scales, as well as the test-retest reliability, the convergent validity, and the discriminate validity. The importance of this data cannot be overstated as it has an essential role to fulfil in determining the scientific quality of the abbreviated KEYS instrument.

According to Amabile (1996) the overall fit measure of the abbreviated instrument indicates a good fit with the original KEYS’s measures. Internal scale reliabilities (Cronbach’s alpha) range from .61 to .80 with the median Cronbach’s alpha in Rosello and Tran’s (2010) study being .70, whereas in the original KEYS the median was .84.

The following Cronbach’s alphas were obtained for each dimension in the stimulant scale: organisational encouragement ($\alpha = 0.61$), supervisor encouragement ($\alpha = 0.60$), work group support ($\alpha = 0.80$), sufficient resources ($\alpha = 0.75$), challenging work ($\alpha = 0.70$) and freedom ($\alpha = 0.74$). The Cronbach’s alphas obtained for each dimension in the obstacle scales were: organisational impediment ($\alpha = 0.63$) and workload pressure ($\alpha = 0.79$). Furthermore, the test-retest reliabilities of the scales, over a period of two months, yielded a median of .80, thus confirming a fair degree of stability of the results (Rosello & Tran, 2010). The KEYS instrument has demonstrated that it successfully discriminates between different work environments. This is reflected by the fact that stimulant scales are rated lower and

obstacles scales higher, for work environments with projects with low creative outcomes, compared to environments with projects with high creative outcomes (Amabile, 1996).

Amabile, Conti, Coon, Lazenby and Herron (1996) state that the abbreviated KEYS measurement instrument makes use of the same 4-point Likert type scales as those used in the original version of the KEYS. The four-point response scale was utilised in the KEYS with the intent to avoid a midpoint in order to force respondents away from a neutral default option. The points on the scale correspond to a rating of "how often true" the statement is of a respondent's current work environment (never or almost never, sometimes, often, always or almost always).

It should be noted that cognisance has been taken of the fact that the Cronbach alpha's of three of the dimensions included in the abbreviated version of the KEYS are below.70. Although these dimensions serve as a cause for concern, it has been decided to make use of the abbreviated KEYS instrument due to the satisfactory scores obtained on the test-retest reliabilities of the scales included in the measure. A total score of 96 can be obtained on the KEYS instrument with higher scores reflecting a positive creative climate and *vice versa*. In essence, the abbreviated version of the KEYS will assess the perceived stimulants and obstacles to creativity in organisational work environments and in this research study it will be utilised to measure the *Team Climate for Innovation* dependent variable in the theoretical model.

### 3.4.2 Perceived organisational innovativeness (PORGI) measurement scale

Hurt and Teigen (1977) developed the scale of Perceived Organisational Innovativeness (PORGI) which serves as a measure of innovativeness at the organisational level on the basis of self-reports from organisation members.

The PORGI consists of twenty-five questions and participants are invited to respond by using a five-point Likert type scale ranging from "strongly disagree" to "strongly agree". The scoring procedure results in organisations being categorised into one of five groups that have been defined by Rogers (1995): (a) Innovators, (b) Early Adopters, (c) Early Majority, (d) Late Majority, and (e) Laggards/Traditionalists.

Hurt and Teigen (1977, p. 383) state that "the subjects for the initial test of the PORGI were educators, and the instrument has exceptional reliability and equally acceptable construct and predictive validity". More specifically, Hurt and Teigen (1977, p.70) reported that "the

split-half reliability of the scale was .96." The original normative group for the PORGI produced a mean score of 98 with a standard deviation of 28 (Bauck, 2002).

Brandon (2008, p. 37) mention that the "PORGI has been used many times in studies and has an alpha reliability above .90 and a very good predictive validity." This is supported by the fact that the Cronbach's alpha for the PORGI used in four different research studies ranged between 0.93 to 0.98 (Hurt & Teigen, 1977; Richmond & McCroskey, 1979; Simonson, 2000; Brahier, 2006).

Hurt and Teigen (1977) determined that the PORGI has a high level of construct and predictive validity, and concluded that their efforts to produce "a measure of organisational innovativeness have been very positive." Similarly, a review of innovation literature indicates that the PORGI has been used extensively by itself and in combination with other evaluation instruments to assess innovativeness at the organisation level (Hurt & Teigen, 1977). A total score of 96 can be obtained on the PORGI instrument with higher scores reflecting higher levels of perceived innovativeness and *vice versa*. In essence, the PORGI will serve as a measure of "how innovative" an organisation/team/work group, its members, products and processes is through the self-reports of its members. In this research study the PORGI will be utilised to measure the *Perceived Innovation Outcomes of the Team* dependent variable included in the theoretical model.

### 3.5 Statistical Analyses

The statistical analysis of the data will involve the calculation of a number of Cronbach's Alpha coefficients to assess the internal consistency of each of the ILQ sub-dimensions, competencies, as well as the global ILQ scale. High levels of internal consistency with regard to the dimensions of the ILQ will promote the use of the dimensions as diagnostic tools, indicating where a test-taker must focus his/her attention in order to increase his/her effectiveness with respect to the facilitation of innovative behaviour.

This source of information will be supplemented by exploratory (confirmatory) factor analysis with the aim of confirming the unidimensionality of the dimensions, the expected factor structure of the dimensions as well as the total scale (where possible). The criterion-related validity of the ILQ, and its dimensions will be determined by correlating the average ILQ scores of a particular team with the average KEYS and PORGI scores per team leader (as evaluated by the team members), as well as with the KEYS and PORGI scores of the team leader (self-ratings).

### 3.6 Summary

In this chapter the research methodology underlying the study was discussed and explained in detail. This included the planning, item development, assembling, and pre-testing of the ILQ instrument. Additionally, details of the measurement instruments used and the statistical analyses to be performed on the research data were discussed. The following chapter will present the research findings of this study.

# CHAPTER 4: RESEARCH RESULTS

## 4.1 Introduction

In this chapter the research results pertaining to the demographics of the research sample and psychometric properties (i.e. item analysis and dimensionality analysis) of the ILQ instrument will be discussed comprehensively.

## 4.2 Sample Demographics

The unit of analysis for this research study consisted of leaders and their respective subordinates from 73 innovative work teams. Research participants were specifically selected from organisational departments and/or work units in which teams function with the intention of creating and delivering innovative output and results.

The total sample size was 335 research participants and included 73 innovative work teams from nine different South African organisations. Additionally, these teams were specifically chosen from different industries and/or departments to ensure that the research findings will reflect the diverse nature of the South African work environment. Innovative work teams functioning in the retail, information technology, government, financial services, telecommunications, agriculture and manufacturing industries participated in the data collection process of this research study.

## 4.3 Item Analysis

Item analysis was conducted on the test items included in the ILQ instrument by means of STATISTICA (StatSoft 11.0, 2012). The purpose of this procedure is to identify and eliminate any possible test items that do not contribute to the internal consistency of the instrument. Anastasi and Urbina (1997) mention that high validity and reliability can be built into tests in advance through item analysis, thus improving tests through the selection, substitution or revision of test items. In this specific research study instruments with a Cronbach alpha coefficient of .75 and above were considered as having satisfactory internal consistency (Cronbach, 1949).

Item analysis was conducted on each of the dimensions and competencies included in the ILQ instrument. In order to obtain a clear understanding of the three groupings of items in

the ILQ it will serve useful to consult Table 3.1, which depicts the ILQ framework. Firstly, item parcels constitute the most basic grouping of items in the ILQ. Item parcels consist of ILQ test items that cluster together and represent specific facets of the dimension subscale. Secondly, the dimension grouping consists of different item parcels that collectively reflect a specific dimension. Thirdly, competencies reflect the highest-order grouping of items in the ILQ and include various dimensions that will cluster together to reflect a specific competency in the ILQ competencies framework.

### 4.3.1 Item analysis findings

The following section will provide an overview of the item analyses conducted on the dimensions and competencies of the ILQ. For these analyses the responses of team leaders as well as team members were utilised with the unit of analysis being the individual rater.

#### *4.3.1.1 Dimensions*

The following section will provide an overview of the findings with respect to the item analyses for each of the dimensions included in the ILQ. It should be noted that dimensions consist of multiple item parcels that represent specific facets of the dimensions of the ILQ.

A summary of the reliability coefficients for each of the dimensions included in the ILQ will be presented in Table 4.1 below.

Table 4.1

*Summary of the Reliability Coefficients of the dimensions included in the ILQ*

| Dimension | Sample Size | N | M | SD | α |
|---|---|---|---|---|---|
| Deciding and Initiating Action | 335 | 5 | 17.36 | 3.77 | .86 |
| Analysing | 335 | 3 | 10.89 | 2.27 | .81 |
| Entrepreneurial and Commercial Thinking | 335 | 7 | 25.09 | 5.45 | .90 |
| Presenting and Communicating Information | 335 | 7 | 14.27 | 3.26 | .87 |
| Persuading and Influencing | 335 | 6 | 21.09 | 4.59 | .89 |
| Planning and Organising | 335 | 3 | 10.72 | 2.23 | .78 |
| Working with People | 335 | 9 | 31.43 | 6.41 | .89 |
| Applying Expertise and Technology | 335 | 5 | 18.43 | 3.88 | .88 |
| Relating and Networking | 335 | 3 | 10.87 | 2.45 | .81 |
| Following Instructions and Procedures | 335 | 2 | 7.10 | 1.67 | .77 |
| Adapting and Responding to Change | 335 | 5 | 18.27 | 4.02 | .89 |
| Learning and Researching | 335 | 2 | 6.99 | 1.90 | .77 |
| Adhering to Principles and Values | 335 | 2 | 7.28 | 1.70 | .71 |

All of the dimensions included in the ILQ revealed acceptable reliability coefficients (α > .70) and therefore it was decided to retain all of the dimensions included in the ILQ.

Table 4.2

*Reliability Analysis of the Deciding and Initiating Action dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 1 | 13.73 | 9.92 | 3.15 | .70 | .83 |
| 2 | 13.83 | 9.54 | 3.09 | .67 | .83 |
| 17 | 14.14 | 8.87 | 2.98 | .65 | .84 |
| 21 | 13.82 | 9.44 | 3.07 | .73 | .82 |
| 34 | 13.94 | 9.30 | 3.05 | .65 | .84 |

The reliability coefficient for the Deciding and Initiating Action dimension revealed good internal consistency (α = .86). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha.

Table 4.3

*Reliability Analysis of the Analysing dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 3 | 7.28 | 2.47 | 1.57 | .65 | .75 |
| 15 | 7.22 | 2.51 | 1.59 | .69 | .71 |
| 28 | 7.28 | 2.51 | 1.59 | .65 | .75 |

The reliability coefficient for the Analysing dimension revealed acceptable internal consistency (α = .81). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.4

*Reliability Analysis of the Entrepreneurial and Commercial Thinking dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 4 | 21.39 | 23.20 | 4.82 | .65 | .89 |
| 26 | 21.50 | 22.55 | 4.75 | .71 | .89 |
| 27 | 21.37 | 22.35 | 4.73 | .73 | .88 |
| 52 | 21.33 | 23.34 | 4.83 | .64 | .89 |
| 57 | 21.68 | 21.51 | 4.64 | .72 | .88 |
| 62 | 21.54 | 20.68 | 4.55 | .79 | .88 |
| 66 | 21.71 | 21.05 | 4.59 | .72 | .89 |

The reliability coefficient for the Entrepreneurial and Commercial Thinking dimension revealed good internal consistency (α = .90). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.5

*Reliability Analysis of the Presenting and Communicating Information dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 5 | 10.60 | 6.22 | 2.49 | .74 | .83 |
| 8 | 10.81 | 6.29 | 2.50 | .70 | .84 |
| 50 | 10.67 | 6.30 | 2.51 | .70 | .84 |
| 63 | 10.72 | 6.04 | 2.46 | .74 | .82 |

The reliability coefficient for the Presenting and Communicating Information dimension revealed good internal consistency (α = .87). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.6

*Reliability Analysis of the Persuading and Influencing dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 6 | 17.59 | 15.29 | 3.91 | .68 | .87 |
| 23 | 17.47 | 15.32 | 3.91 | .67 | .87 |
| 25 | 17.57 | 14.66 | 3.83 | .73 | .86 |
| 45 | 17.61 | 14.65 | 3.83 | .77 | .86 |
| 55 | 17.54 | 15.10 | 3.89 | .74 | .86 |
| 56 | 17.65 | 14.58 | 3.81 | .64 | .88 |

The reliability coefficient for the Persuading and Influencing dimension revealed good internal consistency (α = .89). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha.

Table 4.7

*Reliability Analysis of the Planning and Organising dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 7 | 7.16 | 2.35 | 1.53 | .65 | .67 |
| 16 | 7.14 | 2.58 | 1.61 | .62 | .71 |
| 51 | 7.14 | 2.41 | 1.55 | .59 | .73 |

The reliability coefficient for the Planning and Organising dimension revealed acceptable internal consistency (α = .78). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.8

*Reliability Analysis of the Working with People dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 9 | 28.47 | 32.87 | 5.73 | .54 | .89 |
| 11 | 27.86 | 34.24 | 5.85 | .52 | .89 |
| 13 | 27.80 | 32.81 | 5.73 | .72 | .88 |
| 19 | 27.66 | 32.86 | 5.73 | .70 | .88 |
| 29 | 27.86 | 32.44 | 5.70 | .74 | .87 |
| 30 | 27.78 | 32.85 | 5.73 | .70 | .88 |
| 36 | 27.99 | 32.45 | 5.70 | .67 | .88 |
| 41 | 28.16 | 32.38 | 5.69 | .64 | .88 |
| 68 | 27.84 | 31.91 | 5.65 | .67 | .88 |

The reliability coefficient for the Working with People dimension revealed good internal consistency (α = .89). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.9

*Reliability Analysis of the Applying Expertise and Technology dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 14 | 14.66 | 10.61 | 3.26 | .66 | .87 |
| 22 | 14.60 | 10.27 | 3.20 | .70 | .86 |
| 38 | 14.74 | 9.77 | 3.13 | .77 | .85 |
| 58 | 14.85 | 9.40 | 3.07 | .73 | .86 |
| 64 | 14.86 | 9.42 | 3.07 | .75 | .85 |

The reliability coefficient for the Applying Expertise and Technology dimension revealed good internal consistency (α = .88). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.10

*Reliability Analysis of the Relating and Networking dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 24 | 7.30 | 3.00 | 1.73 | .61 | .77 |
| 53 | 7.12 | 2.91 | 1.70 | .67 | .72 |
| 59 | 7.32 | 2.86 | 1.69 | .67 | .71 |

The reliability coefficient for the Relating and Networking dimension revealed acceptable internal consistency (α = .81). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.11

*Reliability Analysis of the Following Instructions and Procedures dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 32 | 3.49 | .81 | .90 | .63 | |
| 47 | 3.61 | .90 | .95 | .63 | |

The reliability coefficient for the Following Instructions and Procedures dimension as a whole revealed an acceptable internal consistency (α = .77). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.12

*Reliability Analysis of the Adapting and Responding to Change dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 33 | 14.41 | 10.80 | 3.29 | .74 | .87 |
| 37 | 14.62 | 10.86 | 3.29 | .72 | .88 |
| 44 | 14.69 | 10.45 | 3.23 | .78 | .86 |
| 61 | 14.86 | 10.32 | 3.21 | .70 | .88 |
| 67 | 14.50 | 10.49 | 3.24 | .77 | .86 |

The reliability coefficient for the Adapting and Responding to Change dimension revealed good internal consistency (α = .89). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.13

*Reliability Analysis of the Learning and Researching dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 43 | 3.47 | 1.20 | 1.09 | .62 | |
| 60 | 3.52 | 1.03 | 1.01 | .62 | |

The reliability coefficient for the Learning and Researching dimension as a whole revealed an acceptable internal consistency (α = .77).

Table 4.14

*Reliability Analysis of the Adhering to Principles and Values dimension*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 48 | 3.56 | .96 | .98 | .55 | |
| 54 | 3.72 | .90 | .95 | .55 | |

The reliability coefficient for the Adhering to Principles and Values dimension as a whole revealed an acceptable internal consistency (α = .71) but it should however be noted that this internal consistency is not very strong.

From the tables above it is clear that all of the dimensions included in the ILQ instrument have acceptable levels of internal consistency. The only exception would be the Adhering to Principles and Values dimension which revealed an acceptable, but not very strong internal consistency.

#### *4.3.1.2 Competencies*

The following section will provide an overview of the item analysis findings of each competency included in the ILQ instrument. It should be noted that each competency consists of various dimensions. A summary of the reliability coefficients for each of the eight competencies included in the ILQ instrument will be presented in Table 4.15 below.

Table 4.15

*Summary of the Reliability Coefficients of all the Competencies included in the ILQ*

| Competency | Sample Size | N | M | SD | α |
|---|---|---|---|---|---|
| Leading and Empowering Team Members | 335 | 14 | 49.14 | 10.33 | .95 |
| Recognising and Valuing Team Member Input | 335 | 11 | 38.70 | 7.79 | .91 |
| Influencing Key Stakeholders | 335 | 13 | 46.22 | 9.61 | .94 |
| Applying Technical Expertise | 335 | 8 | 29.32 | 5.76 | .91 |
| Strategy Development | 335 | 3 | 10.46 | 2.60 | .81 |
| Goal-Setting and Activity Alignment | 335 | 6 | 21.28 | 4.41 | .88 |
| Adapting and Accepting New Ideas | 335 | 6 | 22.04 | 4.74 | .91 |
| Monitoring Opportunities and Commercialisation | 335 | 7 | 25.09 | 5.45 | .90 |

All of the competencies included in the ILQ revealed good reliability coefficients ($\alpha > .80$) and therefore it was decided to retain all of the competencies included in the ILQ.

Table 4.16

*Reliability Analysis of the Leading and Empowering Team Members competency*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 1 | 45.50 | 94.14 | 9.70 | .73 | .94 |
| 2 | 45.61 | 93.43 | 9.67 | .68 | .94 |
| 10 | 45.73 | 90.31 | 9.50 | .78 | .94 |
| 12 | 45.53 | 92.15 | 9.60 | .77 | .94 |
| 17 | 45.92 | 90.56 | 9.52 | .72 | .94 |
| 18 | 45.76 | 96.19 | 9.81 | .48 | .95 |
| 20 | 45.41 | 92.32 | 9.61 | .73 | .94 |
| 21 | 45.60 | 92.51 | 9.62 | .77 | .94 |
| 31 | 45.40 | 92.25 | 9.60 | .73 | .94 |
| 34 | 45.72 | 91.86 | 9.58 | .71 | .94 |
| 35 | 45.93 | 90.33 | 9.50 | .71 | .94 |
| 39 | 45.50 | 91.93 | 9.59 | .76 | .94 |
| 42 | 45.68 | 90.07 | 9.49 | .79 | .94 |
| 46 | 45.57 | 91.31 | 9.56 | .79 | .94 |

The reliability coefficient for the Leading and Empowering Team Members competency revealed good internal consistency ($\alpha = .95$). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.17

*Reliability Analysis of the Recognising and Valuing Team Member Input competency*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 9 | 35.74 | 50.56 | 7.11 | .56 | .91 |
| 11 | 35.13 | 52.54 | 7.25 | .52 | .91 |
| 13 | 35.07 | 50.48 | 7.10 | .74 | .90 |
| 19 | 34.94 | 50.64 | 7.12 | .71 | .90 |
| 29 | 35.14 | 50.11 | 7.08 | .74 | .90 |
| 30 | 35.06 | 50.44 | 7.10 | .72 | .90 |
| 36 | 35.26 | 50.08 | 7.08 | .68 | .90 |
| 41 | 35.44 | 50.03 | 7.07 | .65 | .91 |
| 48 | 34.99 | 49.70 | 7.05 | .74 | .90 |
| 54 | 35.14 | 50.69 | 7.12 | .64 | .91 |
| 68 | 35.12 | 49.60 | 7.04 | .67 | .90 |

The reliability coefficient for the Recognising and Valuing Team Member Input competency revealed good internal consistency (α = .91). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.18

*Reliability Analysis of the Influencing Key Stakeholders competency*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 5 | 42.55 | 78.96 | 8.89 | .73 | .94 |
| 6 | 42.73 | 79.55 | 8.92 | .71 | .94 |
| 8 | 42.76 | 78.50 | 8.86 | .75 | .94 |
| 23 | 42.60 | 79.88 | 8.94 | .69 | .94 |
| 24 | 42.65 | 79.73 | 8.93 | .66 | .94 |
| 25 | 42.70 | 78.56 | 8.86 | .73 | .94 |
| 45 | 42.74 | 78.30 | 8.85 | .78 | .94 |
| 50 | 42.62 | 78.78 | 8.88 | .73 | .94 |
| 53 | 42.47 | 78.92 | 8.88 | .73 | .94 |
| 55 | 42.67 | 79.35 | 8.91 | .75 | .94 |
| 56 | 42.78 | 77.94 | 8.83 | .68 | .94 |
| 59 | 42.67 | 78.32 | 8.85 | .75 | .94 |
| 63 | 42.67 | 78.11 | 8.84 | .75 | .94 |

The reliability coefficient for the Influencing Key Stakeholders competency revealed good internal consistency (α = .94). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.19

*Reliability Analysis of the Applying Technical Expertise competency*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 3 | 25.71 | 26.18 | 5.12 | .65 | .90 |
| 14 | 25.56 | 25.91 | 5.09 | .73 | .89 |
| 15 | 25.65 | 26.26 | 5.12 | .68 | .90 |
| 22 | 25.50 | 25.61 | 5.06 | .74 | .89 |
| 28 | 25.71 | 25.91 | 5.09 | .70 | .90 |
| 38 | 25.64 | 25.35 | 5.03 | .75 | .89 |
| 58 | 25.75 | 24.86 | 4.99 | .70 | .90 |
| 64 | 25.75 | 24.98 | 5.00 | .70 | .90 |

The reliability coefficient for the Applying Technical Expertise competency revealed good internal consistency (α = .91). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha.

Table 4.20

*Reliability Analysis of the Strategy Development competency*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 43 | 6.94 | 3.33 | 1.83 | .64 | .76 |
| 49 | 6.99 | 3.61 | 1.90 | .64 | .77 |
| 60 | 6.99 | 2.88 | 1.70 | .71 | .69 |

The reliability coefficient for the Strategy Development competency revealed acceptable internal consistency (α = .81). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.21

*Reliability Analysis of the Goal-Setting and Activity Alignment competency*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 7 | 17.72 | 13.94 | 3.73 | .69 | .86 |
| 16 | 17.70 | 14.55 | 3.81 | .65 | .86 |
| 32 | 17.67 | 13.52 | 3.68 | .72 | .85 |
| 47 | 17.79 | 13.70 | 3.70 | .74 | .85 |
| 51 | 17.70 | 13.89 | 3.73 | .68 | .86 |
| 65 | 17.82 | 13.29 | 3.65 | .65 | .87 |

The reliability coefficient for the Goal-Setting and Activity Alignment competency revealed good internal consistency (α = .88). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.22

*Reliability Analysis of the Adapting and Coping competency*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 33 | 18.18 | 15.95 | 3.99 | .76 | .89 |
| 37 | 18.39 | 15.98 | 4.00 | .75 | .90 |
| 40 | 18.27 | 16.11 | 4.01 | .76 | .89 |
| 44 | 18.46 | 15.60 | 3.95 | .79 | .89 |
| 61 | 18.63 | 15.57 | 3.95 | .69 | .90 |
| 67 | 18.26 | 15.69 | 3.96 | .77 | .89 |

The reliability coefficient for the Adapting and Coping competency revealed good internal consistency (α = .91). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

Table 4.23

*Reliability Analysis of the Monitoring Opportunities and Commercialisation competency*

| ILQ Test Item | Mean if deleted | Variance if deleted | Standard deviation if deleted | Item-Total Correlation | Alpha if deleted |
|---|---|---|---|---|---|
| 4 | 21.39 | 23.20 | 4.82 | .65 | .89 |
| 26 | 21.50 | 22.55 | 4.75 | .71 | .89 |
| 27 | 21.37 | 22.35 | 4.73 | .73 | .88 |
| 52 | 21.33 | 23.34 | 4.83 | .64 | .89 |
| 57 | 21.68 | 21.51 | 4.64 | .72 | .88 |
| 62 | 21.54 | 20.68 | 4.55 | .79 | .88 |
| 66 | 21.71 | 21.05 | 4.59 | .72 | .89 |

The reliability coefficient for the Monitoring Opportunities and Commercialisation competency revealed good internal consistency (α = .90). All the test items appeared worthy of retention as the deletion of any of the test items did not lead to an increase in the alpha coefficient.

From the tables above it is clear that each of the eight competencies included in the ILQ instrument indicated good internal consistencies.

#### *4.3.1.3 Manager and subordinate ratings*

The following section will present an overview of the differences between leader and subordinate scores obtained on the ILQ, KEYS and PORGI instruments. The differences between leader and subordinate scores on each of the competency subscales included in the ILQ are presented in Table 4.24 below.

Table 4.24

*Differences between the ratings of Leaders and Subordinates on the Competencies Subscales included in the ILQ*

| ILQ Competency | Mean Differ.* | SD | p | -95.00% Cnf.Lmt | +95.00% Cnf.Lmt |
|---|---|---|---|---|---|
| Leading and Empowering Team Members | -.12 | .09 | .19 | -.31 | .06 |
| Recognising and Valuing Team Member Input | -.08 | .09 | .40 | -.27 | .10 |
| Influencing Key Stakeholders | -.10 | .09 | .25 | -.29 | .08 |
| Applying Technical Expertise | -.03 | .09 | .74 | -.20 | .14 |
| Strategy Development | -.27 | .12 | .02 | -.50 | -.04 |
| Goal-Setting and Activity Alignment | -.12 | .10 | .22 | -.32 | .08 |
| Adapting and Coping | -.08 | .10 | .46 | -.28 | .13 |
| Monitoring Opportunities and Commercialisation | -.11 | .10 | .26 | -.30 | .08 |

From Table 4.24 it is clear that the difference between the ratings of leaders and their subordinates in this study on each of the competency subscales were not considered significant ($p > .05$), with the only exception being Strategy Development. This would indicate that the self-ratings of the team leaders and the manner in which the team leaders were evaluated by their subordinates on each of the ILQ competencies did not differ significantly.

Overall, the scores of leaders (i.e. self-ratings) and the scores of subordinates (evaluating their respective leaders) did not differ significantly, with the only exception being the Strategy Development competency.

Table 4.25

*Differences between the ratings of Leaders and Subordinates on the ILQ, KEYS and PORGI instruments*

| Measurement Instrument | Mean Differ.* | SD | p | -95.00% Cnf.Lmt | +95.00% Cnf.Lmt |
|---|---|---|---|---|---|
| ILQ | -.10 | .09 | .28 | -.28 | .08 |
| KEYS | .12 | .05 | .01 | .03 | .21 |
| PORGI | .11 | .06 | .06 | -.00 | .22 |

From Table 4.25 it is clear that the difference between the mean scores of leaders and their subordinates obtained on the ILQ and PORGI instrument were insignificant ($p > .05$). The difference between the mean scores of leaders and their subordinates obtained on the KEYS instrument was, however, significant ($p < .05$). Overall, the scores of leaders and their subordinates did not differ significantly on the PORGI instrument, but the difference on the KEYS instrument was however significant.

This would indicate that although the majority of leaders and their subordinates had the same viewpoint with regard to the perceived innovative outcomes of their work team, their perception with regard to the innovative climate in these work teams differed in most cases.

#### *4.3.1.4 ILQ competencies*

The following section will focus on the eight competencies included in the ILQ instrument and more specifically focus on the extent to which they correlate with one another. The inter-correlation of the eight competencies is depicted in Table 4.26 below.

Table 4.26

*Intercorrelation Matrix of the Eight ILQ Competencies*

| Competencies | LE | RV | IK | AT | SD | GA | AC | MC |
|---|---|---|---|---|---|---|---|---|
| LE | 1 | | | | | | | |
| RV | .88*** | 1 | | | | | | |
| IK | .87*** | .85*** | 1 | | | | | |
| AT | .91*** | .88*** | .91*** | 1 | | | | |
| SD | .89*** | .85*** | .91*** | .91*** | 1 | | | |
| GA | .90*** | .85*** | .85*** | .90*** | .87*** | 1 | | |
| AC | .81*** | .82*** | .84*** | .83*** | .83*** | .82*** | 1 | |
| MC | .82*** | .79*** | .85*** | .85*** | .86*** | .82*** | .77*** | 1 |

[2]* $p < .05$, one-tailed. ** $p < .01$, one-tailed. *** $p < .001$, one-tailed.

*Note.* LD = Leading and Empowering Team Members; RV = Recognising and Valuing Team Member Input; IK = Influencing Key Stakeholders; AT = Applying Technical Expertise; SD = Strategy Development; GA = Goal-Setting and Activity Alignment; AC = Adapting and Coping; MC = Monitoring Opportunities and Commercialisation.

From Table 4.26 it is clear that all eight of the innovation leadership competencies included in the ILQ correlate highly positively with one another. This has positive implications for the structure of the ILQ instrument as a whole as the entire instrument (including all eight competencies) collectively measure innovation leadership. The fact that all eight competencies correlate high with one another indicates that each of the eight competencies has an essential role or function to fulfil in innovation leadership.

#### *4.3.1.5 Conclusions derived from item analysis*

Overall, a number of different conclusions can be made from the item analysis. Firstly, all eight competencies measured by the ILQ and the instrument as a whole demonstrated high levels of reliability. Secondly, the differences between the ratings of managers and subordinates on the ILQ psychological measurement instrument were not significant in this research study, with the exception of Strategy Development. The reason for the differences between the perspectives of the team leaders and the team members is not clear at this stage. Thirdly, the eight competencies of the ILQ correlated positively and strongly with one

* Mean difference refers to the mean scores of managers subtracted by the means cores of subordinates

another. It should hence be clear that the ILQ instrument demonstrated satisfactory levels of reliability over various spectrums.

### 4.4 Dimensionality Analysis

Each of the subscales representing the latent variables included in the ILQ psychological measurement instrument was guided by a specific design. More specifically, the test items compromising each scale and subscale of the ILQ were specifically designed to act as sets of stimuli to which research participants will respond with sets of behaviour that serve as a primary expression of a specific underlying latent variable.

Factor analysis, including parallel analysis, represents a set of multivariate statistical methods that are used for data reduction and ultimately determining the number and nature of common factors needed to account for the patterns of observed correlations (Fabrigar, Wegener, MacCallum & Strahan, 1999). There is evidence that parallel analysis is one of the most accurate methods for determining the number of factors to retain (Velicer, Eaton & Fava, 2000; Zwick & Velicer, 1986).

There are multiple approaches for conducting a parallel analysis (Glorfeld, 1995; Horn, 1965; Zwick & Velicer, 1986). One common method involves performing a principal component analysis on an observed correlation matrix. Subsequently, multiple correlation matrixes are generated assuming that the observed data consists out of uncorrelated multivariate normally distributed population data with the same number of variables and sample size as the observed data. Principal component analysis will be conducted on each of the random correlation matrices and the mean eigenvalues for the sequential components will be computed. The assessed number of dimensions will be equal to the number of eigenvalues for the observed data that exceeds the respective means of eigenvalues for the random data (Green, Levy, Thompson, Lu & Wen-Juo, 2012).

When it is anticipated that extracted factors might strongly correlate with another, it is useful to make use of oblimin rotation during the principal component factor analysis.

The following section will describe in detail how dimensionality analysis was conducted on the ILQ instrument. Initially, parallel analysis was conducted on the ILQ and subsequently an exploratory factor analysis utilising principal component methodology (oblimin rotation) was conducted on the items of the instrument which revealed two underlying factors. A second exploratory factor analysis was conducted on the dimensions of the ILQ instrument which resulted in a single factor solution termed innovative leadership competencies.

The results of the initial parallel analysis indicated that there are two underlying factors present in the structure of the ILQ, as presented in Figure 4.1 below.

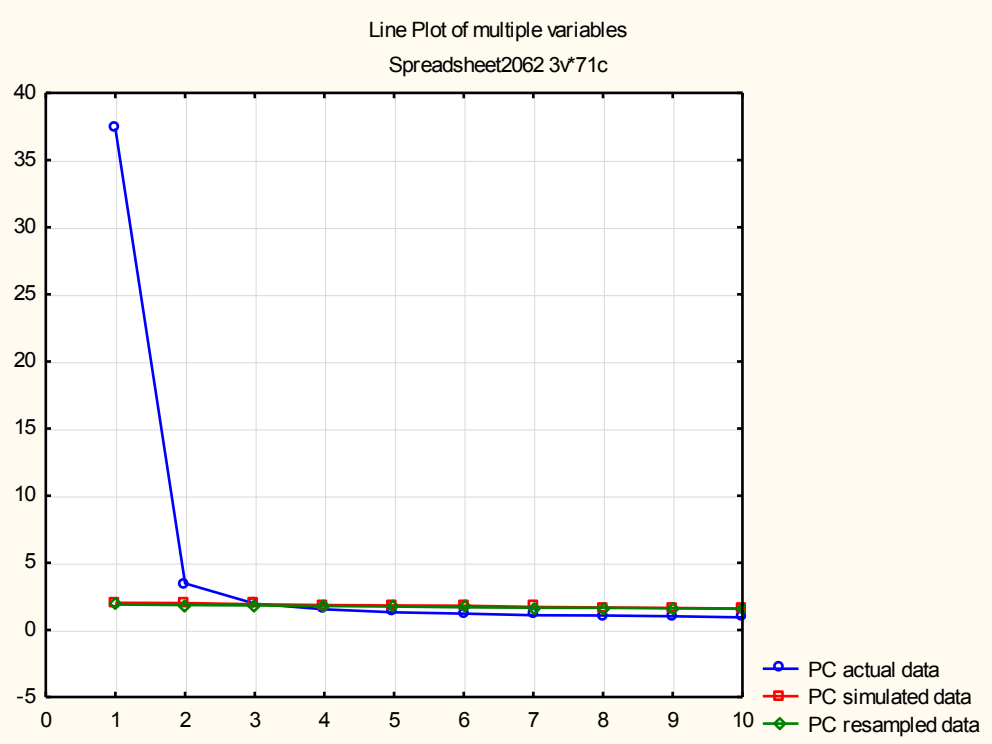


*Figure 4.1* Parallel analysis conducted on the ILQ

A principal component factor analysis with oblimin rotation was performed on the test items as it was anticipated that the underlying factors will correlate strongly with one another.

In order to gain clarity regarding the two factors revealed by the parallel analysis, and more specifically, the identity of each factor, the factor loadings of the principal component factor analysis was studied with respect to each of the 68 items of the ILQ instrument. It was concluded that factor 1 represented idea development (encompassing both idea generation and screening), whilst factor 2 represented commercialisation. The process whereby this conclusion was drawn will be explained in more detail in Table 4.27 below.

Table 4.27 indicates how each of the 68 test items included in the structure of the psychological measurement instrument loads onto either factor 1 (idea development) or factor 2 (commercialisation).

Red will indicate when a specific test item of the ILQ loads onto a factor, blue will indicate when the test item loads onto both factors and white will indicate that the test item does not load onto any one of the two factors. For the purposes of this study, factor loadings greater than .30 were considered significant.

It is clear that test items 1 to 33 load onto factor 1 which represents idea development. These findings correspond with the manner in which the different phases in the innovation process progresses. In simple terms, idea development has a critical role to fulfil during the idea generation and idea screening phases – clearly indicated by the exploratory factor analysis in this case.

From test item 37 to test item 47 the overwhelming majority of test items loaded onto both factor 1 (idea development) and factor 2 (commercialisation). These findings correspond with the manner in which the innovation process progresses. In simple terms, as the innovation process progresses a shift will occur whereby those involved in the innovation process focus less use on creativity and increasingly more on that of innovation. These loadings that occur on both factors will essentially constitute the transition from creativity to innovation, and more specifically, commercialisation.

Finally, it is clear that test items 49 to 67 load onto factor 2 which represents commercialisation. These findings correspond with the manner in which the innovation process progresses. In simple terms, the latter stages of the innovation process will focus on the implementation, diffusion and commercialisation of ideas and innovation has a critical role to fulfil in these work practices.

Overall the exploratory factor analysis provided valuable results as the factor loadings clearly corroborated the fact that the ILQ psychological measurement instrument follows a systematic progression that corresponds with the various phases of the innovation process. The existing overarching factor solution of the ILQ instrument at dimension level followed by the two factor solution at item level represents a pyramidal shape.

Table 4.27

*Overview of the Exploratory Factor Analysis conducted on the ILQ*

| | Factor 1 (Idea Development) | Factor 2 (Commercialisation) |
|---|---|---|
| Item 1 | -.57 | .22 |
| Item 2 | -.68 | .05 |
| Item 3 | -.72 | .02 |
| Item 4 | -.77 | .03 |
| Item 5 | -.73 | .12 |
| Item 6 | -.71 | .06 |
| Item 7 | -.76 | .03 |
| Item 8 | -.75 | .09 |
| Item 9 | -.42 | .23 |
| Item 10 | -.64 | .20 |
| Item 11 | -.78 | -.27 |
| Item 12 | -.80 | .00 |
| Item 13 | -.79 | .03 |
| Item 14 | -.71 | .05 |
| Item 15 | -.74 | .03 |
| Item 16 | -.70 | .04 |
| Item 17 | -.70 | .03 |
| Item 18 | -.61 | -.08 |
| Item 19 | -.80 | -.07 |
| Item 20 | -.93 | -.17 |
| Item 21 | -.67 | .17 |
| Item 22 | -.70 | .02 |
| Item 23 | -.76 | -.02 |
| Item 24 | -.65 | .05 |
| Item 25 | -.66 | .12 |
| Item 26 | -.69 | .12 |
| Item 27 | -.67 | .18 |
| Item 28 | -.78 | .02 |
| Item 29 | -.82 | -.04 |
| Item 30 | -.77 | .03 |
| Item 31 | -.87 | -.08 |
| Item 32 | -.71 | .14 |
| Item 33 | -.62 | .21 |
| Item 34 | -.15 | .69 |
| Item 35 | -.16 | .64 |
| Item 36 | -.52 | .20 |
| Item 37 | -.49 | .31 |
| Item 38 | -.27 | .52 |
| Item 39 | -.67 | .15 |
| Item 40 | -.48 | .31 |
| Item 41 | -.33 | .38 |
| Item 42 | -.49 | .38 |
| Item 43 | -.35 | .44 |
| Item 44 | -.44 | .45 |
| Item 45 | -.40 | .47 |
| Item 46 | -.48 | .41 |

Table 4.7 (Continued)

| | Factor 1 (Idea Development) | Factor 2 (Commercialisation) |
|---|---|---|
| Item 47 | -.45 | .41 |
| Item 48 | -.61 | .23 |
| Item 49 | -.16 | .68 |
| Item 50 | -.19 | .63 |
| Item 51 | -.30 | .52 |
| Item 52 | -.28 | .52 |
| Item 53 | -.32 | .45 |
| Item 54 | -.22 | .57 |
| Item 55 | -.29 | .52 |
| Item 56 | .05 | .83 |
| Item 57 | .06 | .87 |
| Item 58 | -.01 | .80 |
| Item 59 | -.18 | .67 |
| Item 60 | .03 | .89 |
| Item 61 | .05 | .92 |
| Item 62 | .01 | .84 |
| Item 63 | -.15 | .72 |
| Item 64 | -.03 | .79 |
| Item 65 | .10 | .92 |
| Item 66 | .15 | .95 |
| Item 67 | -.30 | .57 |
| Item 68 | -.39 | .34 |

In Table 4.28 below the results obtained from the principal component factor analysis (oblimin rotation) will be presented and discussed in more detail.

Table 4.28

*Principal Component Factor Analysis (Oblimin Rotation) conducted on the ILQ*

| Value | Eigenvalue | % Total variance | Cumulative eigenvalue | Cumulative % |
|---|---|---|---|---|
| Factor 1 | 37.35 | 54.93 | 37.35 | 54.93 |
| Factor 2 | 3.41 | 5.01 | 40.76 | 59.94 |

From Table 4.28 it is evident that the principal component factor analysis (oblimin rotation) on the items in the ILQ revealed that two distinct factors are measured by the instrument, namely that of idea development and commercialisation, which are recognisable as aspects of the innovation process. Furthermore, factor 1 (idea development) explained approximately 54% of the variance in the ILQ and factor 2 (commercialisation) explained only a further 5% of the variance.

The two underlying factors of idea development and commercialisation revealed by the principal component factor analysis correlated strongly, but negatively with one another as presented in Table 4.29 below.

Table 4.29

*Correlation between underlying factors in the ILQ*

| Value | 1 | 2 |
|---|---|---|
| Factor 1 | 1 | -.72 |
| Factor 2 | -.72 | 1 |

The implication of this strong, yet negative correlation between idea development and commercialisation would imply that the better leaders perform in one of the factors the worse they will perform in the other factor. For instance, if a leader would perform well on the idea development front, then he/she will perform less successful on the commercialisation front and *vice versa*.

A principal component factor analysis was subsequently performed on the dimension scores of the ILQ instrument with the objective of evaluating the extent to which the dimensions included in the ILQ measure the specific latent variables it was designed to evaluate. The findings from the exploratory factor analysis will be presented in Table 4.30 below.

Table 4.30

*Exploratory Factor Analysis conducted on the ILQ*

| Eigenvalue | % Total | Cumulative | Cumulative |
|---|---|---|---|

| | Variance | Eigenvalue | % |
|---|---|---|---|
| 12.99 | 76.42 | 12.99 | 76.42 |

From Table 4.30 it is clear that the approximately 77% of the variance in the ILQ was due to systematic variance, whereas only about 23% of the variance in the ILQ can be ascribed to random error variance. It should be clear from the results reported that the ILQ dimensions measure one central factor in the form of innovative leadership.

### 4.4.1 Conclusions derived from dimensionality analysis

Overall, a number of different conclusions can be made from the Dimensionality Analysis. Firstly, a parallel analysis was conducted on the 68 items included in the ILQ instrument which indicated that there are two factors underlying the structure of the ILQ instrument. Secondly, a principal component factor analysis with oblimin rotation was conducted on the items included in the ILQ instrument as it was anticipated that the factors will correlate strongly with one another. Thirdly, a second factor analysis was conducted on the dimensions and resulted in a single factor solution termed innovation leadership competencies. The amount of variance therefore increased substantially from 59% (with the correlated oblimin analysis) to 77% for the single factor at dimension level. This could well be attributed to the fact that tighter construction of the instrument in the latter analysis diminished the large amount of error variance reported earlier and resulted in a greater amount of variance explained.

It should also be noted that the two factors of idea development and commercialisation correlate strongly but negatively with another. This would imply that the better leaders perform on one factor, the weaker they will perform on the other factor which would result in the fact that leaders often make use of different individuals with different skill sets throughout the various phases in the innovation process. The identification of the two distinct factors proved that the content of the ILQ instrument follows a logical and systematic progression which corresponds with the various phases in the innovation process.

## 4.5 Measurement Instruments

The following section will provide a brief overview of the reliability results obtained for the ILQ, KEYS and PORGI measurement instruments utilised in this specific research study.

### 4.5.1 Reliability coefficients of the ILQ, KEYS and PORGI instruments

The reliability coefficients for the ILQ, KEYS and PORGI instruments will be presented in Table 4.31 below.

Table 4.31

*Reliability Coefficients for ILQ, KEYS and PORGI instruments*

| Measurement Instrument | Sample Size | Number of Items | Mean | SD | Average inter-item correlation | α |
|---|---|---|---|---|---|---|
| ILQ | 335 | 68 | 114.47 | 22.58 | .66 | .98 |
| KEYS | 335 | 24 | 73.30 | 9.40 | .22 | .86 |
| PORGI | 335 | 25 | 90.50 | 12.33 | .28 | .90 |

The Cronbach alpha reliability coefficients for the ILQ, KEYS and PORGI instruments were all considered satisfactory (α > .80). It is especially important to take note of the high reliability coefficient reported for the overall scale of the ILQ instrument.

### 4.5.2 Split-half reliability coefficients of the KEYS and PORGI instruments

The following section will present an overview of the split-half reliabilities reported for the KEYS and PORGI instruments. Split-half reliability provides a measure of consistency whereby a test is divided in two and the scores for each part of the test are correlated with another. The default split-half reliability for SPSS is the Spearman Brown split-half reliability coefficient and is used to estimate full test reliability based on split-half reliability measures. The Guttman split-half reliability is an adaptation of the Spearman Brown split-half reliability coefficient, but does not require equal variances between the two split forms.

In Table 4.32 and Table 4.33 below the split-half reliabilities will be presented for both the KEYS and PORGI instruments.

Table 4.32

*Split-half reliability coefficients of the KEYS measurement instrument*

| Scale | Cronbach alpha full scale | Correlation 1st & 2nd half | Attenuation corrected | Split-half reliability | Guttman split-half |
|---|---|---|---|---|---|
| KEYS | .86 | .74 | 1.00 | .85 | .85 |

From the data above it is clear that the KEYS instrument is associated with satisfactory reliability results (α > .80) in terms of the split-half reliability coefficients reported.

Table 4.33

*Split-half reliability coefficients of the PORGI measurement instrument*

| Scale | Cronbach alpha full scale | Correlation 1st & 2nd half | Attenuation corrected | Split-half reliability | Guttman split-half |
|---|---|---|---|---|---|
| PORGI | .90 | .88 | 1.00 | .94 | .92 |

From the data above it is clear that the PORGI instrument is associated with satisfactory reliability results (α > .80) in terms of the split-half reliability coefficients reported.

### 4.5.3 Correlations between the ILQ, KEYS and PORGI instruments

The correlations between the ILQ, KEYS and PORGI instruments for team leaders are presented in Table 4.34 below.

Table 4.34

*Correlations between the ILQ, KEYS and PORGI for team leaders*

| Variable 1 | Variable 2 | Pearson | Pearson p-val | Spearman | Spearman p-val |
|---|---|---|---|---|---|
| ILQ | KEYS | .63 | <0.01 | .65 | <0.01 |
| ILQ | PORGI | .30 | .01 | .31 | <0.01 |

By looking at the Pearson correlation coefficients above it is clear that a strong positive correlation exists between the results obtained on the ILQ instrument and the KEYS instrument for team leaders. Similarly, a moderate positive correlation exists between the ILQ instrument and the PORGI instrument for team leaders. The fact that a moderate positive relation exist between leadership competencies and the perceived innovation outcomes (PORGI) could be attributed to the fact that individual, as well other external factors play a role in the innovation outcomes of work teams.

The correlations between the ILQ, KEYS and PORGI instruments for subordinates are presented in Table 4.35 below.

Table 4.35

*Correlations between the ILQ, KEYS and PORGI for subordinates*

| Variable 1 | Variable 2 | Pearson | Pearson p-val | Spearman | Spearman p-val |
|---|---|---|---|---|---|
| ILQ | KEYS | .62 | <0.01 | .60 | <0.01 |
| ILQ | PORGI | .46 | <0.01 | .47 | <0.01 |

By looking at the Pearson correlation coefficient above it is clear that a strong positive correlation exists between the results obtained on the ILQ instrument and the KEYS measurement instrument for subordinates. Similarly, a positive moderate correlation exists between the ILQ psychological measurement instrument and the PORGI measurement instrument for subordinates. The fact that moderate positive correlations were obtained between leadership competencies and perceived innovation outcomes (PORGI) could be attributed to the fact that individual, as well other external factors play a role in the innovation outcomes of work teams.

### 4.5.4 Conclusions from reliability coefficients of measurement instruments

Overall, a number of different conclusions can be made from the reliability coefficients of the measurement instruments. Firstly, the ILQ psychological measurement instrument demonstrated high levels of reliability. Secondly, both the KEYS and PORGI instruments demonstrated high levels of reliability. Thirdly, the ILQ correlated positively with the KEYs and PORGI instruments for both leaders and their subordinates. The fact that the ILQ

correlated positively with the KEYS and PORGI instruments corroborated the theoretical model which depicted that positive evaluations on the ILQ will correspond with positive scores on both the PORGI and KEYs instruments.

More specifically, it was anticipated that a significant correlation between the ILQ and the KEYS would demonstrate concurrent validity as it was assumed that innovative leadership behaviour would establish an innovative work climate in teams. Similarly, it was anticipated that a significant correlation between the ILQ and the PORGI would demonstrate concurrent validity as it was assumed that innovative leadership behaviour would result in innovative outcomes for work teams.

# CHAPTER 5: CONCLUSION

## 5.1 Introduction

The following chapter will provide an in-depth discussion of the psychometric evaluation of the ILQ instrument, limitations to the research methodology utilised in this study, practical implications of this research study, and suggestions for future research.

## 5.2 Psychometric evaluation of the ILQ

The purpose of this research study was to test the psychometric qualities of the ILQ psychological measurement instrument. In order to determine the reliability and validity of the ILQ, the instrument was subjected to a rigorous process of item and dimensionality analysis.

An item analysis was conducted on each subscale (i.e. dimensions and competencies) of the ILQ to determine the extent to which the test items contribute to the reliability of the instrument. The reliability reported for the total ILQ instrument was .98 and could be regarded as highly satisfactory.

The ILQ was furthermore correlated with the KEYS and PORGI instruments. The inclusion of the KEYS and PORGI instruments in this research study was to ascertain whether the validity of ILQ could be confirmed by means of its relationship with the establishment of an innovative culture in the team, and the perceived innovative outcomes associated with the team. For instance, it would logically make sense that a positive evaluation of a team leader on the ILQ should correspond with positive evaluations on the KEYS and PORGI with reference to that specific team leader. The reason being that the ability of team leaders to display specific leadership competencies (measured by the ILQ) will result in a positive work climate for creativity and innovation (measured by the KEYS) and this work climate will influence team members and make them believe their work team, products/services and processes are indeed innovative (measured by the PORGI).

Correlations between the three instruments were conducted separately and for managers a strong positive correlation (.63) was found between the ILQ and the KEYS, whilst a weak positive correlation (.30) was found between the ILQ and the PORGI. Similarly, for team members a strong positive correlation (.62) was found between the ILQ and the KEYS,

whilst a moderate positive correlation (.46) was found between the ILQ and the PORGI. The reliability coefficients reported for both the KEYS (.86) and the PORGI (.90) in this specific research study was highly satisfactory.

Parallel analysis conducted on the ILQ instrument revealed that there are two underlying factors present in the structure of the ILQ. By studying the factor loadings on each of the test items included in the ILQ it soon became apparent that the two underlying factors could be regarded as idea development (encompassing both idea generation and screening) and commercialisation. These two factors also correlated strongly, but negatively with one another, which would imply that the better a leader performs on one factor; the worse he/she would perform on the other, and *vice versa*. It was promising to see the theoretical confirmation of the innovative flow in the nature of the factor loadings of the ILQ items. In other words, the order and sequence of the test items included in the ILQ instrument corresponded with the systematic manner in which the innovation process progress naturally.

No competencies were identified as factors in the ILQ, although, from a theoretical point of view, the ILQ instrument has immense potential and value as a diagnostic tool for rating the competencies of leaders throughout the various phases in the innovation process.

The highly reliability coefficient of the ILQ has led the researcher to conclude that each of the 68 items included in the instrument will be retained initially as the deletion of some test items would most likely compromise the meticulous theoretical process underlying the construction of the ILQ psychological measurement instrument. Attempts to shorten the instrument will have to be postponed until further studies have confirmed the psychometric properties of the ILQ.

### 5.3 Limitations to the Research Methodology

The following paragraphs will highlight some of the most important limitations encountered in this research study.

Firstly, a non-probability sampling method was utilised in this research study. Non-probability sampling is considered less technical than probability sampling due to the fact that it cannot be assumed that the sample is representative of the population and additionally sampling error cannot be calculated (Blumberg et al., 2008). Non-probability sampling was utilised in this research study partly due to the practical difficulty of finding research participants and partly due to the logistical implications with regard to the distribution and intake of

questionnaires. The sampling method gave rise to the relatively small sample size of the research study and leads to the observation that one should be careful about generalising the results of this study to the general population.

Secondly, some of the research participants indicated that they struggled to understand some of the technical terms included in the ILQ psychological measurement instrument. The completion of the ILQ took these individuals considerably longer than the average time of fifteen minutes and therefore their responses to certain items included in the ILQ might be questioned. However, it should also be mentioned that the research participants which did in fact struggle to understand and interpret some of the terms included the ILQ had very low levels of academic qualifications – lower than the expected minimum requirement of Grade 10 as specified by the test developers of the ILQ.

Thirdly, from the research study it seemed that the emphasis was on the specific phase of the innovation process and less so on the leadership competencies being evaluated. The fact of the matter is, however, that all eight competencies included in the ILQ were in fact facets of one overarching competency in the form of innovative leadership.

## 5.4 Practical Implications

This research study represents a promising first step towards understanding the leadership competencies that are required to stimulate and facilitate innovative behaviour within organisational settings. A positive aspect of this research study is the high level of reliability that was found for the ILQ instrument during the psychometric evaluation of the instrument.

With regard to the practical application of the instrument, organisations will be able to apply the ILQ in the following manner.

Firstly, work teams that are required to produce innovative results in organisations should make use of the ILQ psychological instrument as a diagnostic tool. This would imply that a team leader and his/her direct subordinates should each complete a version of the ILQ in a specific team context. The results obtained from the ILQ will provide a detailed overview of how the leader evaluates his/her own competencies as well as how team members evaluate the competencies of the team leader. These results will provide not only teams, but also organisations, with a valuable overview of the extent to which their team leaders will manage to stimulate and facilitate innovative behaviour in their subordinates.

Secondly, organisations should make use of the information obtained from the ILQ results and specifically design or structure training and developmental initiatives to address specific shortcomings in leaders. Organisations will now be able to pinpoint the strengths and weaknesses of leaders with regard to their ability to stimulate and facilitate innovation in team members. This will allow organisations to decrease costs with regard to the implementation of unnecessary training and development initiatives, by designing specific training and development practices.

Thirdly, organisations will be able to utilise the ILQ as a follow-up tool and monitor the progress and extent to which leaders manage to improve their competencies. This will furthermore provide insight to organisations about how successful specific training and development initiatives were.

Fourthly, in the current research study it was found that variance in the degree to which innovation leadership was exhibited during the innovation process was related to variance in the perceived innovative climate, as well as perceived innovative outcomes.

### 5.5 Suggestions for Future Research

The field of creativity and innovation in itself is dynamic and constantly changing and therefore this research study forms a perfect basis for future research efforts.

Firstly, it is suggested that there should be elaborated on the current ILQ framework. This would imply that research efforts should be conducted on specific item parcels, dimensions and competencies in which there are currently not many test items. Theoretical research on these specific constructs will enable researchers to formulate additional test items that could be included in some elements of the ILQ and increase the reliability of the measure.

Secondly, certain dimensions, included in the ILQ, revealed lower reliability scores. In this regard it will serve useful to review and possibly even rewrite some of the test items included in the dimensions. Another alternative would be to generate additional test items for these dimensions – which will tie in with the suggestion mentioned above.

Thirdly, it is important that the ILQ will be implemented in industries other than those utilised in this research study. Future studies with the ILQ should focus on work teams functioning in research and development, marketing, strategy development and human resource management to name but a few prospective teams which are required to deliver innovative outputs.

Fourthly, the potential use of the ILQ as a diagnostic tool in organisations seems to be unrivalled by any other psychological measurement instrument. Extensive research has been conducted and it is clear that the ILQ is the first instrument of its sort in the field of creativity and innovation. It is therefore important that future research efforts will not only focus on elaboration of the ILQ, but also the development of training and development initiatives that could be implemented after the ILQ has been implemented in a work team. The extensive theoretical content on which the ILQ was developed will provide useful guidelines and information on elements that will need to be included in training and development initiatives aimed at developing the innovative capabilities of leaders in organisational settings.

Fifthly, the field of creativity and innovation is dynamic and currently evolving. It is therefore important that future research efforts on the ILQ will be aware of the fact that certain leadership competencies, which will stimulate and facilitate innovative behaviour in subordinates at the present, might well become redundant in the future. Similarly, new competencies might well be required of future leaders to stimulate and facilitate innovative behaviour in subordinates which we are not even currently aware of. It should thus be clear that the ILQ should be viewed as an instrument that will be constantly evolving to comply with the dynamic nature of creativity and innovation.

In conclusion, the psychometric properties of the ILQ psychological measurement instrument and success with which it was implemented in this research study illustrates that the ILQ serves as a solid basis for future research efforts to build on. The fact that there is not a similar instrument currently in existence should furthermore serve as motivation for future researchers to elaborate on the initial version of the ILQ.

## 5.6 Conclusion

From the research study it is clear that the ability of organisations to act innovatively have become even more important in the current dynamic work environment and this is no different in South Africa. Innovation will however not take place haphazardly within any organisational setting and will be the result of deliberate and planned work practices and procedures. The manifestation of innovation within organisation will to a large extent be the responsibility of those individuals finding themselves in leadership positions, as they will be able to stimulate and facilitate innovative behaviour in their respective team members.

The research study also points out that in order to stimulate and facilitate innovation in team members effective team leaders will need to display specific competencies during specific phases of the innovation process. The development of the ILQ psychological instrument was specifically aimed at the identification of these competencies in leaders with the objective of implementing training and development initiatives to address shortcomings in leadership competencies. The reality is that these leadership competencies can indeed be developed and innovative leaders are not simply “born” with the ability to stimulate and facilitate innovative behaviour in their subordinates.

The purpose of this research study was to design a diagnostic tool (ILQ) with which the innovation competencies of leaders could be assessed throughout the various phases in the innovation process.

In addition, the innovation process is complex and each stage will require that leaders will need to display specific leadership competencies in order to advance to the following stage and finally successfully implement innovation. The ILQ psychological instrument will not only enable organisations to get an indication of the competencies leaders possess, but also help identify weaknesses in leaders and assist with the development of specific training and development initiatives to address these shortcomings. The results of this research study will provide valuable input for organisations aiming to be more innovative.

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